Digital Microscopy Automation

Artificial intelligence · Clinical applications

WEST MEDICA

Vision Pro

Cell imaging analyzer

Concerned kit:
Series 72452
Series 72852

Version 1.16

User manual
11.2019

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CE

Contents

1 Preface

Note:

No all modules are available in all markets.

Vision kits can be purchased and used only by lab specialist working in a lab environment.

In the Vision Kits a difference is stated between Clinical application modules as IVD parts of the kits and the other applications modules as administrative and support modules.

This manual is valid for the following kit identification article number:

- Series 72452 — Pro with four slides and CAM V3400 (Lt545R) camera
- Series 72852 — Pro with eight slides and CAM V3400 (Lt545R) camera

2 Introduction

2.1 About the user manual

This manual is intended for doctors and laboratory assistants performing scanning on the Vision Pro. The manual contains general information about the system's intended use and its components. The manual will be useful for general work with the adjusted system.

If you have any questions regarding the assembly or disassembly of the system, adjustment of equipment, installation, management or maintenance of the software, please contact your support services or the supplier.

2.2 Warnings and precautions

Study the meaning of symbols and safety alerts carefully and always use the system in the safest possible manner. Read all instructions carefully before starting to use the system. Using it without being suitably qualified, or in a manner not specified in this User's manual, may damage or deteriorate the system, cause misleading results or even lead to injury.

2.3 Symbols used on document and system

Attention!
Notice that defines a condition or an action that may result in damage to the system or its functions.

Warning!
Warning about actions or conditions that may result in health risk or life hazard.

Important!
May cause misleading results.

In vitro diagnostic medical device.
Indicates a medical device that is intended to be used as an in vitro diagnostic medical device.

Manufacturer
Indicates the medical device manufacturer

CE conformity marking.

Alternating current

Direct current

Temperature range

Keep dry

2.4 General safety information

The kits are intended to be operated in common laboratory environment.

The Risk clarification list will be communicated to you during the installation or technical training.

Attention!

Once installed the devices should not be moved.

2.5 Intended use

Vision Pro cell imaging analyzer is an optical kit consisting of a scanning microscope with a camera and a computer including software modules for automated analysis of human biological materials.

Vision Pro is intended for in vitro diagnostics and professional use by specialists in a laboratory. The kit delivers information about the pathological and/or physiological state of human cells (cervical, Blood, Bone marrow) in the form of cells galleries. The operator must review and validate the results of the automatic pre-classification to complete the analysis.

For In Vitro Diagnostics.

Kits are available:

- With clinical application module (IVD kit):
  - Vision Hema for blood smear samples stained MGG;
  - Vision Bone Marrow for bone marrow samples stained MGG;
  - Vision Cyto Pap for vaginal cervical samples prepared following the LBC (liquid based cytology) technology and stained Pap;
- With clinical application modules (non-IVD): Vision Extended RBC, Vision Extended PLT, Vision RET, Vision Body Fluids, Vision Cyto Pap ICC, Vision Cyto Vision Cyto STD, Vision Cyto Sperm Sediment, Vision Slide, Vision Malaria;
- With administrative modules (non-IVD): Vision Remote, Vision Manager;
- With consulting and education modules (non-IVD): Vision Suite, Vision Expertise.

Attention!

The kit is designed for analysis of human cells stained according to standard smear staining protocols, e.g. MGG or Pap[1].

[1] Depends on delivery package

Vision Hema Application

Vision Hema is intended for differential count of human white blood cells stained following MGG protocols, characterization of red blood cell morphology and platelet.

The samples are placed on standard laboratory glass slides with bar code printed or labelled to one end. Using an oil objective, oil for microscopy should be used and dropped on the smear.

The kit automatically locates and presents images of blood cells on peripheral blood smears. The operator identifies and verifies the suggested classification of each cell according to type.

Oil and biohazardous material resulting of the analysis should be handled as biological waste following the local regulations.

Kit at its end of life must be decontaminated and disposed at the waste disposal site for electronic devices following the local regulations.

Vision Bone Marrow Application

Vision Bone Marrow is intended for differential count of human formed elements of bone marrow and characterization of bone marrow cell morphology, the samples are stained following MGG protocols.

The samples are placed on standard laboratory glass slides with bar code printed or labelled to one end. Using an oil objective, oil for microscopy should be used and dropped on the smear.

The kit automatically creates digital slide, locates and presents images of formed elements on bone marrow smears. The operator identifies and verifies the suggested classification of each cell according to type.

Oil and biohazardous material resulting of the analysis should be handled as biological waste following the local regulations.

Kit at its end of life must be decontaminated and disposed at the waste disposal site for electronic devices following the local regulations.

Vision Cyto Pap Application

Vision Cyto Pap is intended for differentiation of normal and pathological human epithelial cells in Pap smear prepared following the LBC (liquid based cytology) procedure.

The kit automatically creates digital slide, locates and presents images of pathological objects on cervical cytology smears. The operator identifies and verifies the suggested classification of each cell according to type.

Biohazardous material resulting of the analysis should be handled as biological waste following the local regulations.

Kit at its end of life must be decontaminated and disposed at the waste disposal site for electronic devices following the local regulations.

2.6 Vision Pro Kit components

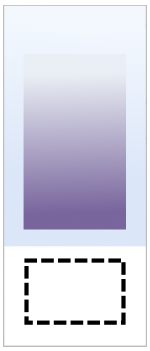
Fig. 1. Vision Pro system

1. Scanning microscope.
2. Barcode/label reader internal (BRI)[2].
3. Oil dispenser (D)[2].
4. Personal computer.
5. Monitor.
6. Vision software.
7. Customer's chosen clinical, data management and education application module.

Warning!
Working with mouse and keyboard might harm the operator and cause body impairment (carpal tunnel syndrome and other medical conditions).

Attention!

The following conditions should be met for correct barcode reading:



1. **The barcode should be located in the area shown on the image above. It will not be read correctly outside of this area.**
2. **1D, 2D and QR barcodes are supported.**
3. **The barcode should be intact.**
4. **The label with the barcode should be put on an opaque surface.**

[2] Depends on delivery package

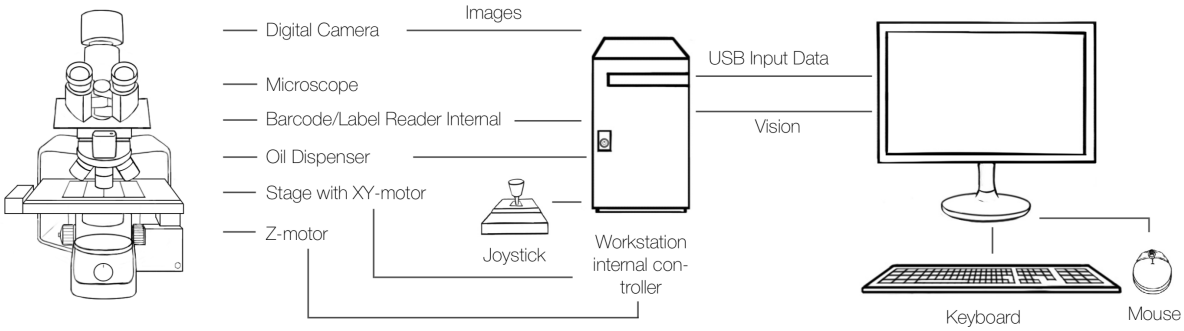


Fig. 2. Vision Pro with 4 slides design

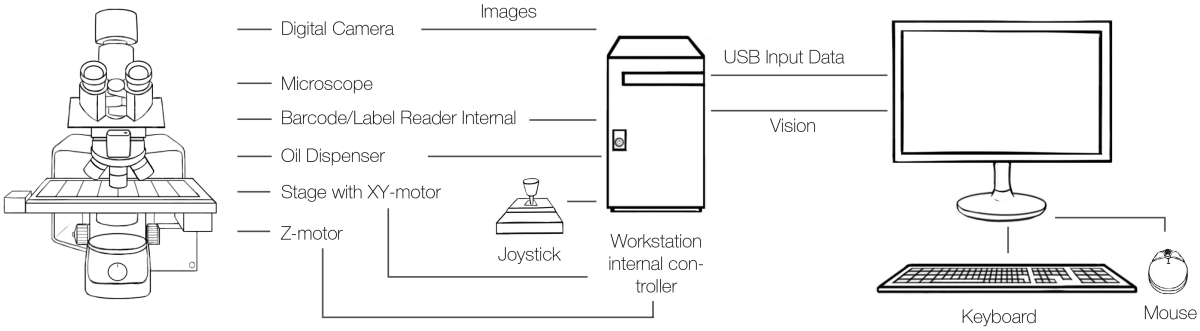


Fig. 3. Vision Pro with 8 slides design

2.7 Kits parts

Description
VP-O4: 10x, 60x oil, 100x oil, 5 MP
VP-O4: 20x, 5 MP
VP-O4: 10x, 20x, 60x oil, 100x oil, 5 MP
VP-O8: 10x, 60x oil, 100x oil, 5 MP
VP-O8: 20x, 5 MP
VP-O8: 10x, 20x, 60x oil, 100x oil, 5 MP
Barcode reader external (BRE)
Barcode reader internal (BRE)
Label reader external (LRE)
Label reader internal (LRE)
Oil dispenser (D)
Printer for labels (P)
Printing ribbon
Labels for printer
Transport case VP

Hema (named CBC in the application´s interface)
Extended RBC
Extended PLT
RET
Bone marrow
Body fluids
Cyto
Cyto Pap
Cyto Pap ICC
Cyto STD
Cyto Sperm Sediment
Slide
Malaria
Manager
Remote
Suite (Server)
Expertise

2.8 Specifications

General specifications	
Working modes	— Queue — Random access
Capacity[3]	— 4 slides — 8 slides
Slide handling	— Manual via cassette replacement — 2 cassettes in the package
Immersion oil dispensing	— Manual — Automatic (optional)
Slide identification	Barcode-labeled/manual
Quality control	Assessing diagnostic parameters: sensitivity, specificity and efficiency
Kit components	
Contents	— Scanning microscope — Barcode reader internal (BRI) (optional) or Label reader

[3] Depends on delivery package

	internal (LRI) (optional) — Immersion oil dispenser (D) (optional)[3] — Personal computer — Monitor — Vision software
Technical specifications	
Simultaneous loading[4]	— Up to 4 slides — Up to 8 slides
Barcode support[4]	1D, 2D, QR (optional)
Optical system[4]	10x, 20x, 40x, 40x Oil, 63x Oil, 100x Oil
Microscopy method	Bright field
Illumination	Koehler, LED
Immersion oil[4]	Automatic dispensing. A bottle of oil is enough for up to 1000 slides (optional)
Communications	Bidirectional LIS, LIS2-A2 (ASTM), HL7, Ethernet
Throughput[4]	— CBC: up to 20 slides per hour (100 WBC, 500 RBC, PLT) — Pap: up to 15 slides per hour (circle ø 12 mm) — STDs: up to 40 slides per hour (100 fields 100x) — Cyto, Histo: ~1.5 min (15x15 mm, 20x) — other samples: on request, depends on the scanning method (magnification, focus mode, …)
Multiple user access	4 preset types of users: Administrator, Doctor, Technician, Receptionist; new types of users can be added; adjustable access rights for users.
Database	Multiple systems can share one database. Possibility to archive analysis results via transfer to external storage media
Power supply	Microscope: DC 5 V, 1,5 A; power supply AC 100–240 V, max 7 W PC: AC 100–240 V, 50–60 Hz, max 400 W/800 W (for Vision Cyto Pap, Cyto Pap ICC, Cyto STD applications) Monitor: AC 100–240 V, 50–60 Hz, max 25 W Oil dispenser (optional): DC 24 V; power supply AC 100–240 V, max 72 W
Work temperature	15–30 °C
Acceptable relative humidity	20–80 %
Operation noise level	59 Db
Required space for complete kit	160 x 80 x 90 cm (L x W x H)

[4] Depends on delivery package

Performance specifications[5]	
Hema (CBC)	— BAS: DSn 91.7, DSp 100.0, DE 99.8 — EOS: DSn 87.5, DSp 100.0, DE 99.9 — BND: DSn 91.1, DSp 99.8, DE 99.1 — SEG: DSn 99.5, DSp 97.7, DE 98.8 — LYM: DSn 95.5, DSp 100.0, DE 98.8 — MON: DSn 99.2, DSp 100.0, DE 99.9 — ART: DSn 97.2, DSp 100.0, DE 99.9
Bone marrow (BM)	— BLA: DSn 61.4, DSp 99.9, DE 97.2 — BAS: DSn 52.4, DSp 99.9, DE 99.6 — EOS: DSn 99.3, DSp 99.4, DE 99.4 — PRO: DSn 41.3, DSp 100.0, DE 99.4 — MYE: DSn 95.6, DSp 98.8, DE 98.6 — MET: DSn 94.7, DSp 99.3, DE 99.1 — BND: DSn 94.1, DSp 99.1, DE 98.8 — SEG: DSn 94.5, DSp 98.0, DE 97.4 — LYM: DSn 96.1, DSp 96.0, DE 96.3 — PLAS: DSn 96.0, DSp 100.0, DE 99.9 — MON: DSn 94.5, DSp 99.0, DE 98.9 — EBL-BASO: DSn 94.5, DSp 99.7, DE 99.6 — EBL-POLY: DSn 94.6, DSp 99.1, DE 98.6 — EBL-ORTH: DSn 70.4, DSp 99.7, DE 99.3 — ART: DSn 74.2, DSp 99.1, DE 98.9
Cyto Pap (Pap)	PAT: DSn 90.0 %, DSp 87.1 % Pathological changes include the following: ASC-US/AGC, ASC-H/AGC-FN, LSIL, HSIL/AIS, SCC/ADC
Modules[5]	
Vision Clinical Application Modules	— Hema (CBC)[6] — human blood cells analysis — Extended RBC (CBC)[7] — extended analysis of erythrocytes — Extended PLT (CBC)[7] — extended analysis of platelets — Bone marrow (BM)[6] — human bone marrow analysis — Body fluids (BF)[7] — body fluids analysis — RET (RET)[7] — reticulocyte analysis — Cyto (Cyto)[7] — cytological examinations — Cyto Pap (Pap)[6] — human cervical cancer screening — Cyto Pap ICC (Pap ICC)[7] — immunocytochemical analysis — Cyto STD (STD)[7] — sexually transmitted diseases diagnostics

[5] Depends on delivery package
[6] IVD kit
[7] Non-IVD

	— Cyto Sperm Sediment (CSS)[7] — cytology of sperm sediment — Slide (Histo)[7] — pathoanatomical examinations — Malaria (HP)[7] — blood test for hemoparasites
Vision Administrative Modules	— Manager[7] — analysis procedure automation, data processing rules — Remote[7] — remote workstation
Vision Consulting and Education Modules	— Suite (Server)[7] — cloud/server for telemedicine and remote consultations with colleagues — Expertise[7] — online testing and quality control
Additional	
Equipment and accessories	— Barcode reader external (BRE) — Label reader external (LRE) — Printer for labels (P) — Printing ribbon — Labels for printer
Environment	
	— stable table without vibration from surrounding equipment — installation only made by West Medica or representatives — repairs only made by West Medica or representatives — risk clarification list — kits connected to the public power supply only via an intact multiple socket with overvoltage protection, — power supply must be permanently accessible

Attention!
Using MS SQL Server Express limits the number of stored samples.

Important![8]
Pap sample pre-classification is not an established diagnosis. User verification is required.
Pathological changes include the following:
ASC-US/AGC, ASC-H/AGC-FN, LSIL, HSIL/AIS, SCC/ADC.
PAT diagnostic sensitivity — 90.0 %
PAT diagnostic specificity — 87.1 %

Attention!
Once installed the devices should not be moved.

[8] Depends on delivery package

Attention!

Do not use oil on 40x non-oil objective as this will destroy the objective.

2.9 Kit requirements

- Intel Core i7 processor, quality processor cooling, providing cooling down to no more than 80 % of max temperature;
- 16 GB RAM;
- NVIDIA GTX x60 or better video card with at least 6 GB video memory;
- NVIDIA GTX x50 or better video card with at least 4 GB video memory[8];
- NVIDIA graphics driver 381.65 or higher;
- 1 TB hard drive[8];
- Windows 7 64-bit or Windows 10;
- DVD drive;
- USB interfaces for external equipment and a protection dongle;
- Full HD monitor [1920x1080];
- Mouse, keyboard.

Attention!

An upgrade of older software versions to version 1.16 is only available if the computer meets the new system requirements.

Attention!

Simultaneous operation of sample scanner and change to sample pre-classification requires GeForce GTX x60 video card with at least 6 GB of video memory.

Attention!

We recommend using MS SQL Server 2014 Standard or better for an increased sample storage capacity.

Attention!

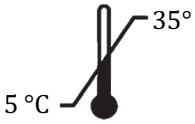
Use additional data storage media to store more samples.

Attention!

We recommend to perform data backup once a day.

2.10 Storage and Handling

Storage
The kit shall be stored within the following climate condition: 5 °C to 35°C (41 °F to 95°F), at a maximum relative humidity of 80% with no condensation allowed.



Transporting the Kit
The kit shall be packaged, transported and unpacked by authorized personnel/carrier only.
We recommend saving the package for possible future transports.
The kit must be installed following the Technical Specification. Please see 2.8 *Specifications.*

Disposal Information
Kit at its end of life must be decontaminated and disposed at a waste disposal site for electronic devices following the local regulations. Please contact your distributor, there are separate disposal of waste of electrical and electronic equipment.

3 Kit Operation

3.1 Starting the kit

Fig. 4. Power supply

1. Turn on the computer.
2. Turn on the power supply and the light of the microscope. The button is on the left side of the microscope.
3. Turn on the power supply of the oil dispenser. Check the volume of oil in the bottle[9].

3.2 Preparing the kit

Wait for the PC to boot-up.

Warning!

Please wear protective gloves to prevent irritation of skin when working with immersion oil.

Fig. 5. Position of the tube in the peristaltic pump

Make sure that the tube is placed correctly in the peristaltic pump. The left image shows incorrect position; the right image shows the correct one[9].

[9] Depends on delivery package

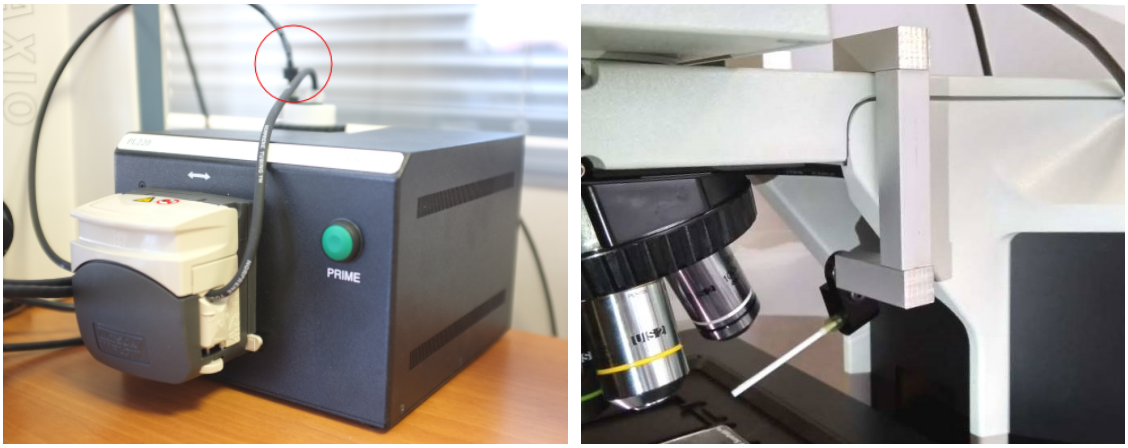


Fig. 6. Preparing the oil dispenser

Prime the oil dispenser tube by holding the “Prime” button for a few seconds. Ensure that the tip is inserted into the bottle. You will hear a token sound during priming and oil will be visible on the oiler tip.

Then set the oil feeding tube close to the objective[10].

3.3 Preparing for sample scanning

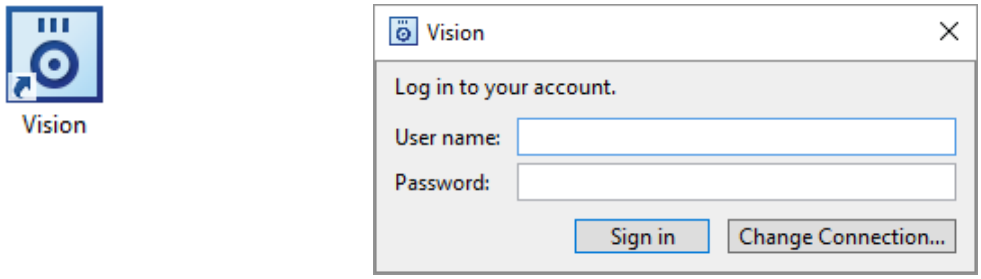


Fig. 7. Logging in to your account

Double-click on the Vision icon. Enter your user name and password in the corresponding fields and click the “Sign in” button to start the application.

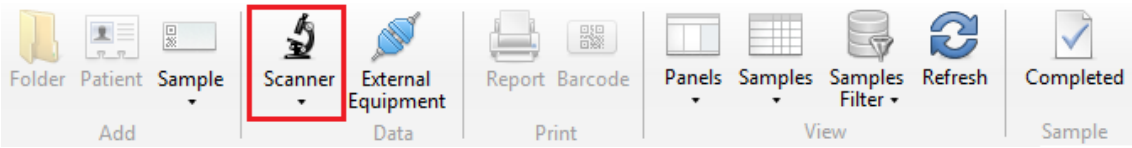


Fig. 8. “Scanner” button

Click the “Scanner” button and choose a sample.

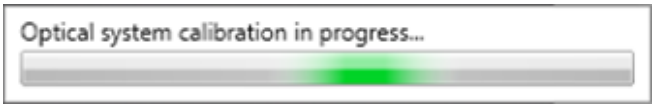


Fig. 9. Calibration process

Wait until the kit is calibrated.

Attention!
Using a non-conform pre-analytic may cause a loss of scanning precision.

[10] Depends on delivery package

Attention!

During motorized focusing operation do not attempt to force stop the focus knob rotation with your hand, etc as this may damage the device.

3.4 Scanning slides

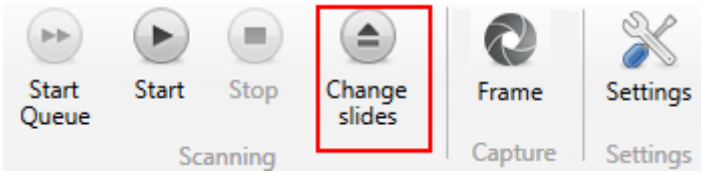


Fig. 10. “Change slides” button

Click the “Change slides” button.

The motorized stage will go down.

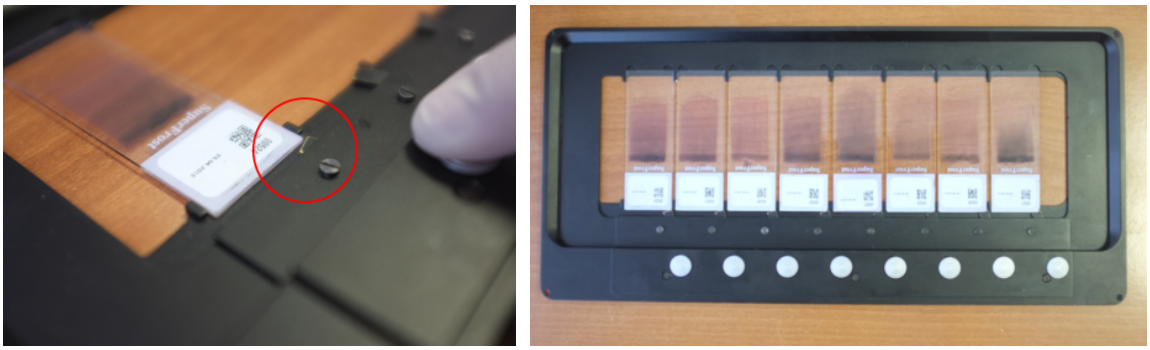


Fig. 11. Cassette

Put slides in the cassette as shown above. Make sure that the slides are placed correctly.

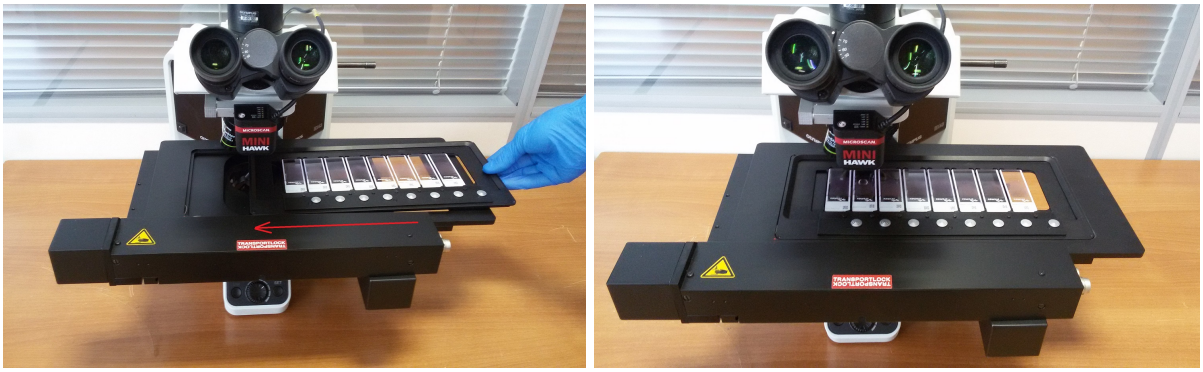


Fig. 12. Installing a cassette with slides

Place the cassette with slides on the motorized stage.

Fig. 13. Applying immersion oil

If you are not using an oil dispenser, apply immersion oil manually to each slide.

Warning!

Please wear protective gloves to prevent irritation of skin when working with immersion oil.

If you have an immersion oil dispenser[11], immersion oil will be applied to each slide automatically before scanning.

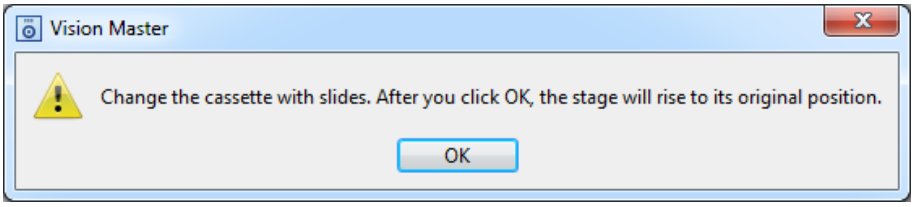


Fig. 14. Changing the cassette with slides

Click “OK”.

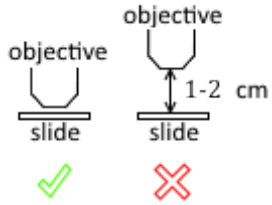


Fig. 15. Position of the stage

Check the position of the stage prior to the first scanning. If necessary, move the stage to the correct position.

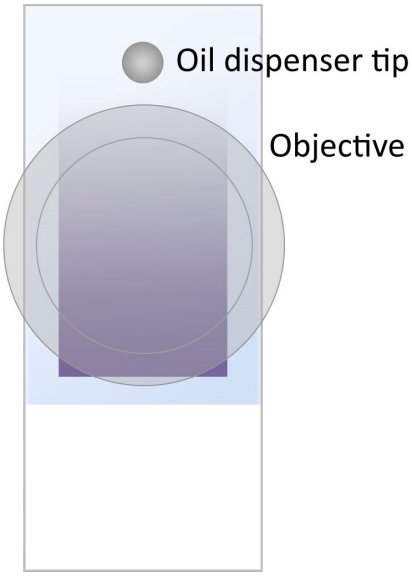
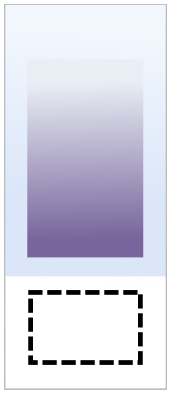


Fig. 16. Correct position of the objective

[11] Depends on delivery package

The barcode is read during slide scanning[12].

Attention!
The following conditions should be met for correct barcode reading:



1. **The barcode should be located in the area shown on the image above. It won't be read correctly outside of this area.**
2. **1D, 2D and QR barcodes are supported.**
3. **The barcode should be intact.**
4. **The label with the barcode should be put on an opaque surface.**

Prior to the first scanning, make sure that the objective is in the middle of the slide #1, the oil dispenser tip[12] is place as shown above and the monitor displays the image of the sample.

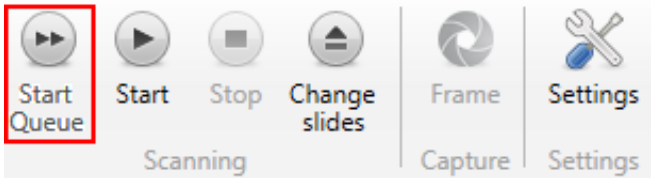


Fig. 17. "Start Queue" button

Click the "Start Queue" button to begin the scanning process.
To place a new cassette with slides, click "Change slides" and repeat the process.

[12] Depends on delivery package

3.5 Validation

Wait until the end of scanning (“Scanned” status).

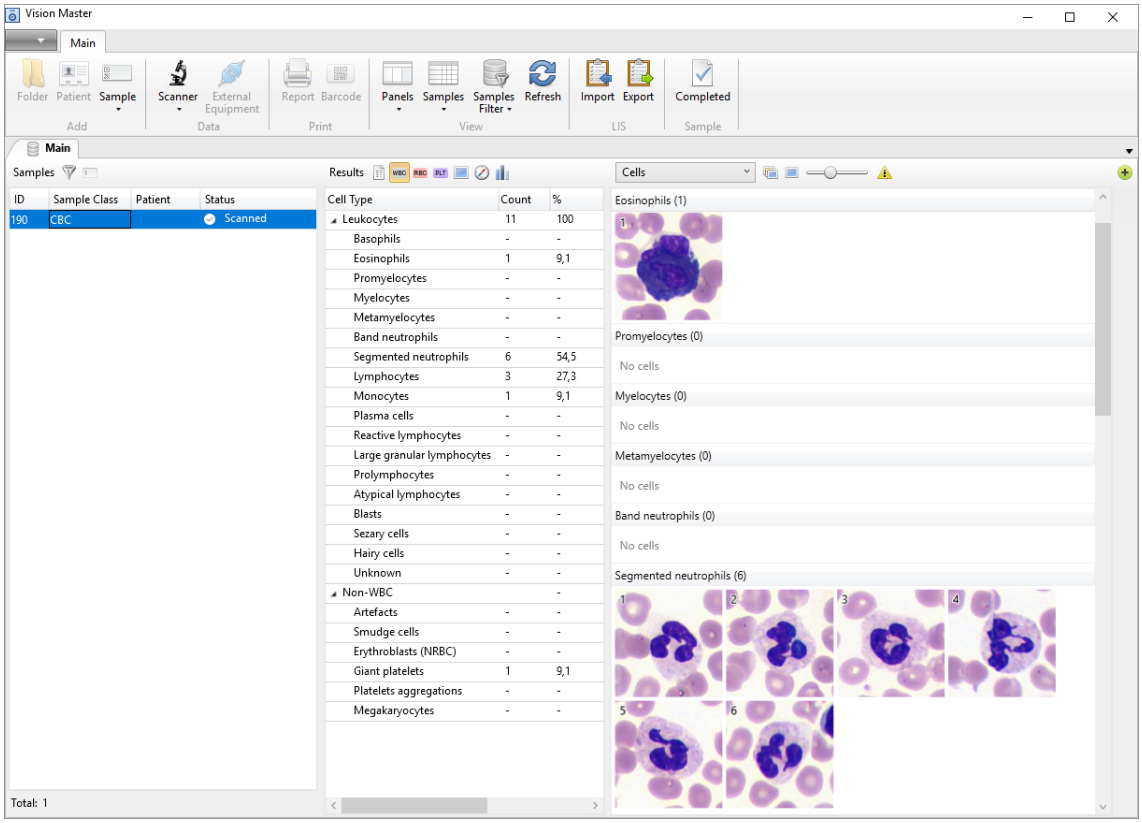


Fig. 18. CBC[13] sample results

Validate the pre-classification on the WBC/RBC/PLT screen.

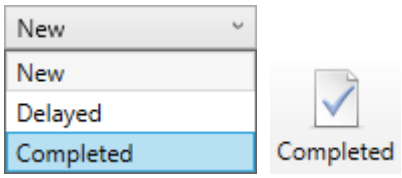


Fig. 19. Changing the status of the sample

Change the status to “Completed”.

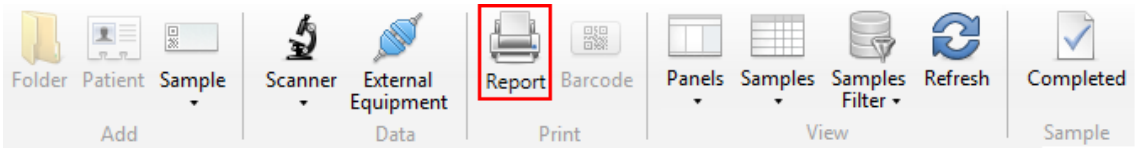


Fig. 20. “Report” button

Click the “Report” button when the status is “Completed”. Print directly or save in PDF.

[13] Depends on delivery package

Important![14]

Pap sample pre-classification is not an established diagnosis. User verification is required.

Pathological changes include the following:

ASC-US/AGC, ASC-H/AGC-FN, LSIL, HSIL/AIS, SCC/ADC.

PAT diagnostic sensitivity — 90.0 %

PAT diagnostic specificity — 87.1 %

Attention!

Simultaneous operation of sample scanner, change to sample pre-classification from the main page, automated and manual DS import requires GeForce GTX x60 video card with at least 6 GB of video memory.

3.6 Finishing operation

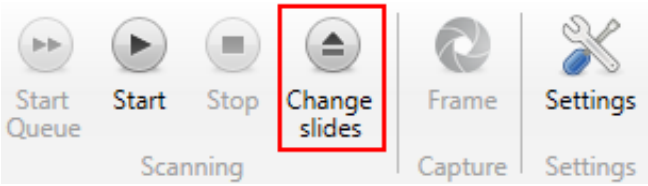


Fig. 21. “Change slides” button

1. Click the “Change slides” button to lower the motorized stage and remove slides. After that, click “OK” to move the stage to its initial position. Close the Vision application.

Fig. 22. Initial position of the oil dispenser

2. Set the oil dispensing tube[14] in its initial position. Make sure that there is a container under the oil dispensing tip protecting the device from oil drops.

Warning!

Please wear protective gloves to prevent irritation of skin when working with immersion oil.

[14] Depends on delivery package

Fig. 23. Power supply

3. Turn off the oil dispenser[15].
4. Turn off the microscope. The button is located on the left side of the microscope.
5. Clean the objectives and the stage, cover the kit with a protective sheet.

Attention!

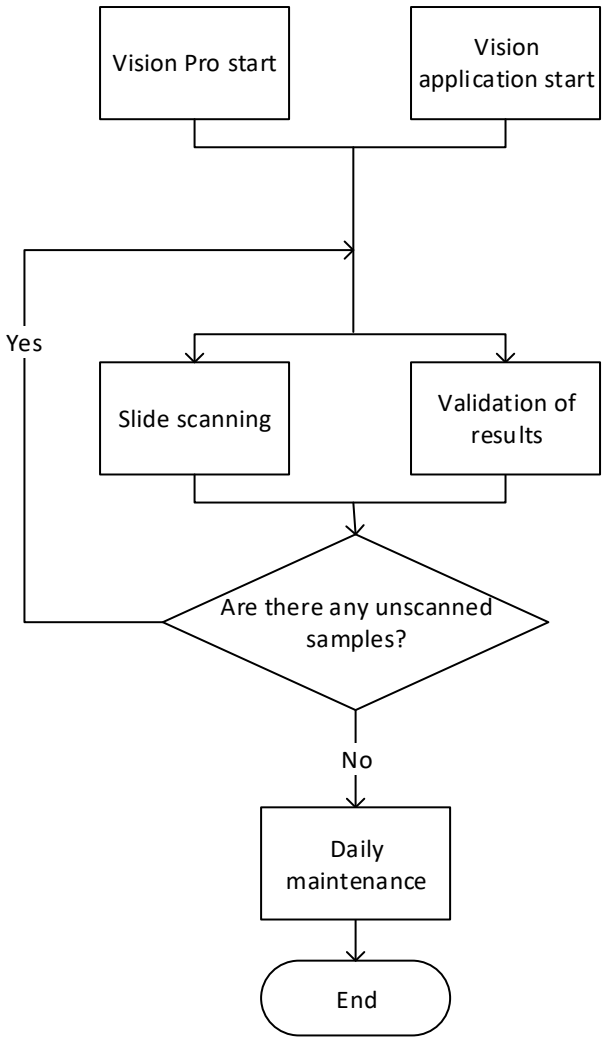
Use alcohol for cleaning no more than once a week. Use diluted alcohol solution for daily cleaning.

6. Turn off the computer.

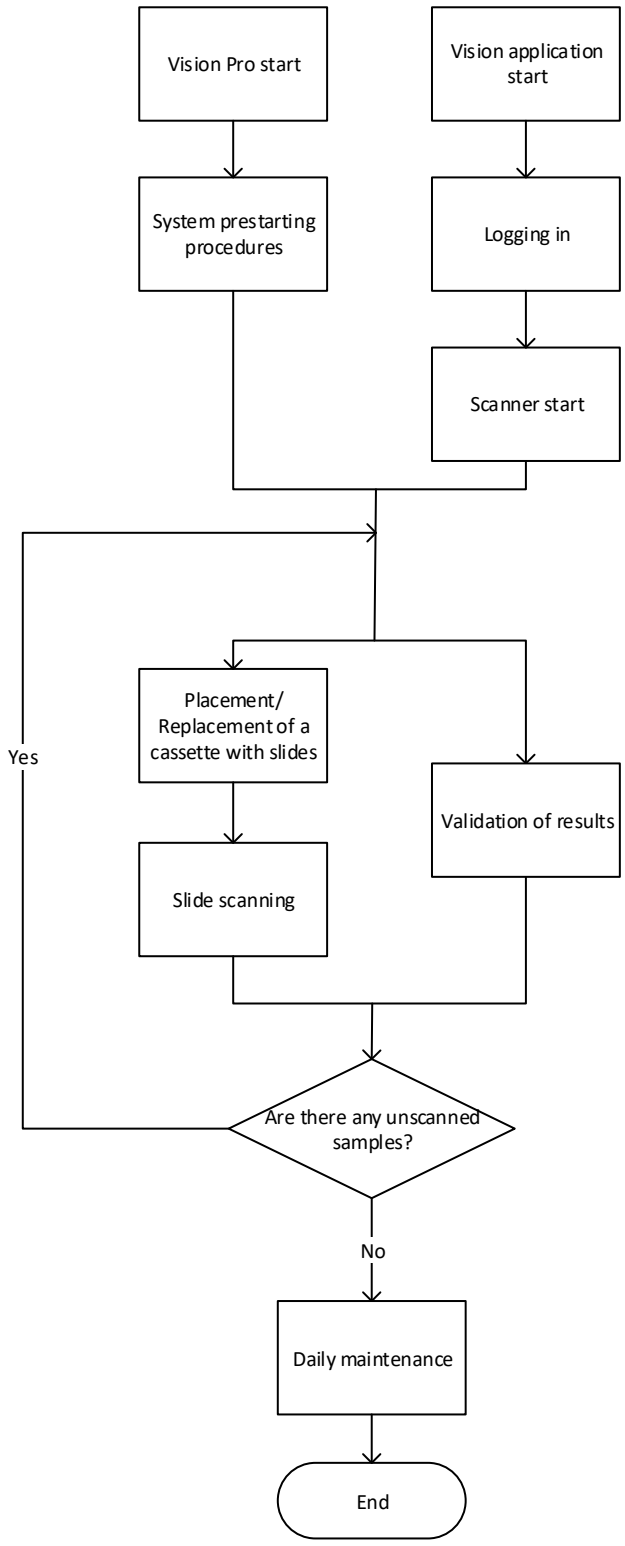
[15] Depends on delivery package

4 Recommended Workflow

4.1 Simplified view



4.2 Detailed workflow



5 Software operation

5.1 Starting Vision

Fig. 24. Vision desktop icon

To start the software, double-click the Vision desktop icon with the left mouse button. You can also start the program by running the application stored in the following folder: C:\Program Files\West Medica\Vision (Start → All Programs → West Medica → Vision).

On the first launch of the application you will need to create a new database or connect to an existing one.

5.2 Demo mode

The application will run in demo mode, if started without a dongle. This mode has several restrictions.

Connect the dongle and restart the application to run the full version. If you disconnect the dongle while working, the application will be closed.

On the first launch run the program as administrator.

5.3 Signing in

When connecting to a SQL server database you need to enter a user name and a password.

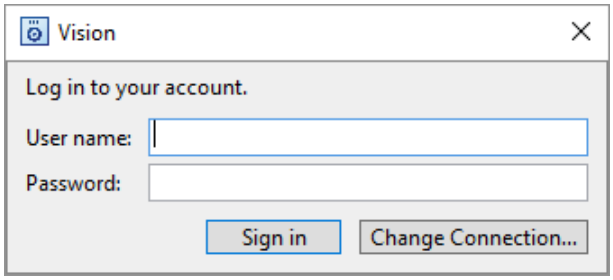


Fig. 25. Logging in to your account

Enter your user name and password in the corresponding fields and click the “Sign in” button to start the application.

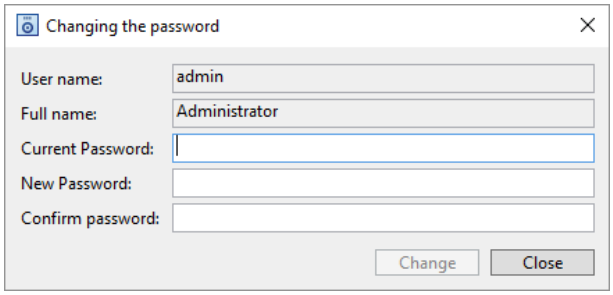


Fig. 26. Password changing window

You might need to change your password on the first connection to the database (if the administrator chooses this function for your profile). If you see this window when logging into the system, you need to change the password. Fill in the empty fields and click the “Change” button.

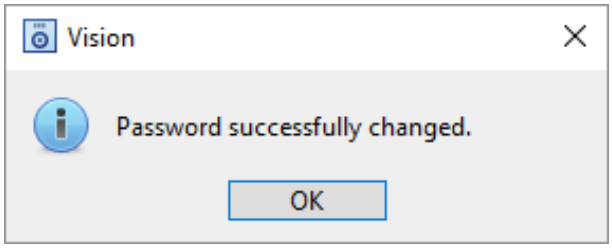


Fig. 27. Password successfully changed

The password is changed now.

5.4 Main Window

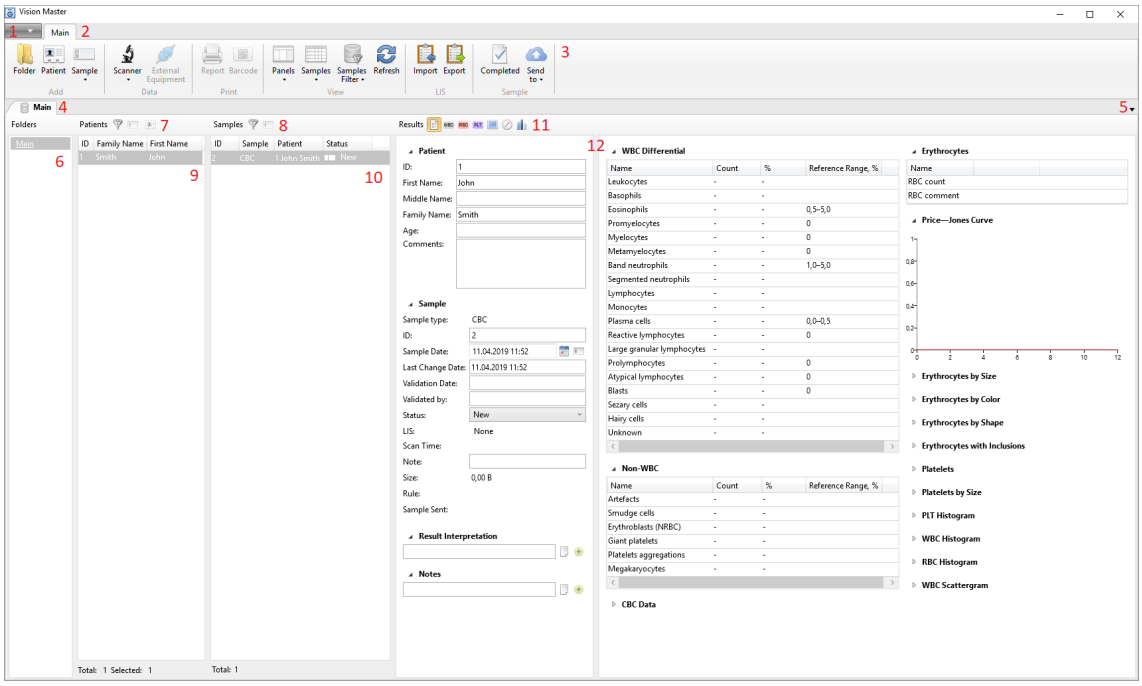


Fig. 28. Layout of the main window controls

When you start the software, the system displays the central window with the following elements:

1. Main menu;
2. Tool bar ribbon;
3. Current tool bar options;
4. Tab ribbon;
5. Tab management options;
6. Folders and Filters window;
7. Patients filters;
8. Samples filters;
9. Patients window;
10. Samples window;
11. Sample information display mode selection;
12. Sample information window.

5.4.1 Main Menu

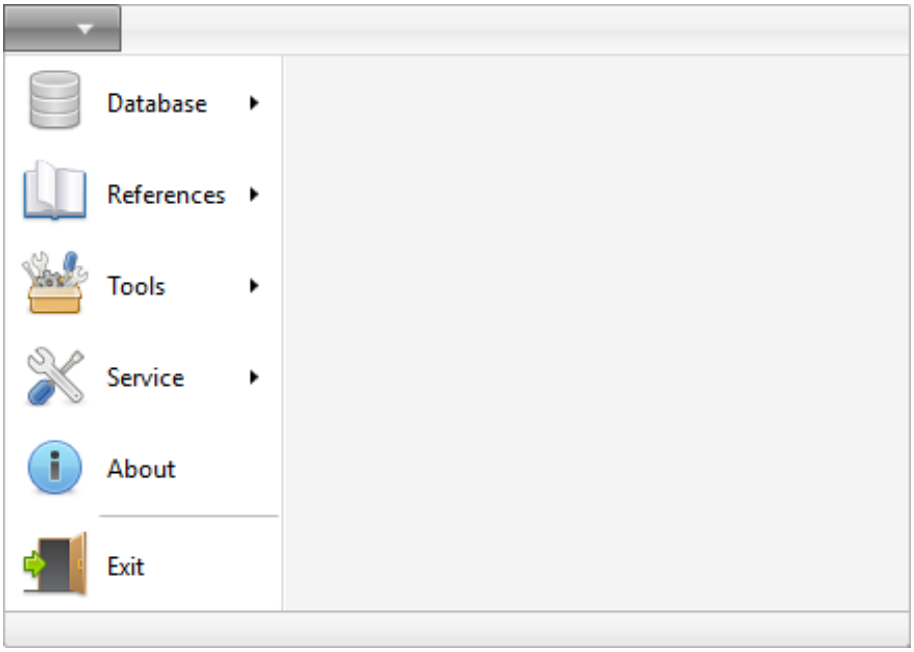


Fig. 29. Main menu

The main menu is used to summon settings and service functions. It contains the following options:

- "Database":
  - "Connection" — changes connection to the database;
  - "Export" — saves a database as a file;

Attention!

Export of patients must be disabled before exporting the DB, if you plan to hand over the data to other persons, i.e. a developer.

  - "Import" — loads a database from a file;
  - "Archive" — switch to the web application for work with archives. Available for databases with a set "Archive URL" and an active "Archive Enabled" checkbox.
- "References":
  - "Sample Attributes" — sample settings;
  - "Cities" — cities settings;
- "Tools":
  - "Quality Control" — processing of kit's performance information;
  - "Sample Counter" — viewing the number of samples left in the dongle;
  - "Event log" — contains all user's actions of sample creation and deletion, and changes of statuses.
  - "Data processing rules"[16] — automation of actions after sample scanning and data reception from external equipment;
- "Service":
  - "Optical Systems" — optics settings: microscopes and objectives;
  - "External Equipment" — adjustment of connected equipment;
  - "Settings" — user settings for the application;

[16] Depends on delivery package

    - "LIS communication settings" — user settings of communication with LIS. Available only with connection to MS SQL Server;
- "About" — contains the information regarding the application;
- "Exit" — quits the application.

The main menu options are described in the following sections: "Database", "References", "Tools" and "Service".

If the application is connected to a database located on the server, the main menu will display information about the user logged in the application.

5.4.2 "Main" Control Ribbon

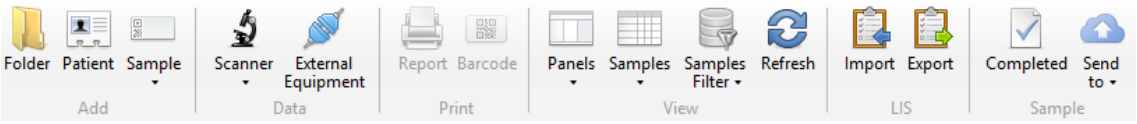


Fig. 30. "Main" control ribbon

The "Main" ribbon contains the following controls:

- "Add" section:
    - "Folder" — creates a new folder in the database;
    - "Patient" — adds a new patient in the selected folder;
    - "Sample"[17] — adds a new sample for scanning.
        - "CBC" — complete blood count;
        - "RET" — analysis of reticulocytes;
        - "Bone marrow" — analysis of bone marrow samples;
        - "BF" — analysis of exudates and cerebrospinal fluid samples;
        - "Cytology" — analysis of cytology samples;
        - "CSS" — cytological analysis of sperm sediment;
        - "Pap" — cervical cytology;
        - "Pap ICC" — immunocytochemical analysis of cervical pap smears;
        - "STDs" — cytology of genital tract diseases;
        - "Histo" — analysis of histological samples;
        - "Hemoparasites" — analysis of hemoparasites samples;
        - "Several samples…" — opens the dialogue for adding several samples;
- "Data" section:
    - "Scanner"[17] — connection of the analyzer;
        - "CBC";
        - "RET";
        - "Bone marrow";
        - "BF";
        - "Cytology";
        - "CSS";
        - "Pap";
        - "Pap ICC";
        - "STDs";
        - "Histo";
        - "Hemoparasites";
    - "External equipment" — connection of equipment to the kit;
- "Print" section:
    - "Report" — creates a report on the selected sample, previews and prints it out;

[17] Depends on delivery package

- “Barcode” — prints a barcode for the selected sample, F8 key on the keyboard;

Attention!
All ID parameters combined should not exceed 40 symbols.

- “View” section:
  - “Panels” — shows/hides panels of patients, samples and results;
  - “Samples”:
    - “Table” — displays the sample list as a table;
    - “Gallery” — displays the sample list as a gallery;
  - “Sample filters”:
    - “Show samples of all patients” — show/hide checkbox;
    - “Show samples of all workstations” — show/hide checkbox;
    - “Show all” — show/hide samples for the kit connected to the local database.
  - “Refresh” — refreshes the displayed data;
- “LIS” section:
  - “Export” button — sends data from Vision to the LIS. Available only with active LIS communication;
  - “Import” button — sends a data update request to the LIS. Available only with the active LIS communication.
- “Sample” section
  - “Completed” button — changes the status of the sample/samples to “Completed”, F9 key on the keyboard;
  - “Send to” — sends a sample to Vision server.

5.4.3 Tab Ribbon

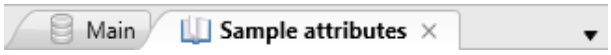


Fig. 31. Current dialogue tabs

Current dialogues are located on the ribbon. Left-click on the tab and drag the tab to a new position while holding the left mouse button.

Depending on the selected dialogue, the ribbons with the corresponding control elements will be switched automatically.

5.4.4 Tab Management

Tab management tools are located at the right end of the tab ribbon. These tools are: open tabs review button and current tab closing button.

The ▾ button displays a drop-down list of open tabs, you can quickly switch to the one you need by clicking on it.

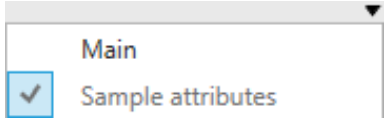


Fig. 32. List of open tabs

5.4.5 Patients

Attention!

To access the patient's personal data in the server DB, you need to enable the "GDPR Approved" parameter in the Vision Database Manager application.

Patients

ID	Family Name	First Name	Middle Name	Gender	Date of Birth	Age
1	Stevenson	Douglas		Male	13.06.1970	44 years
2	Solstroem	Frederik		Male	16.03.1979	36 years

Fig. 33. Patients

The "Patients" dialogue consists of three parts:

- Patient records window;
- Filters of patients;
- Quantitative information: total number of patients and the number of selected patients.

5.4.6 Samples

Samples

Status	Sample Date
New	31.05.2017 12:20
In progress	18.04.2017 13:26
In progress	18.04.2017 13:49
Scanned	29.05.2017 14:52
Scanned	27.04.2017 15:11
Scanned	06.10.2016 11:31
Delayed	14.04.2017 16:55
Delayed	18.04.2017 13:51
Delayed	15.05.2017 16:07
Delayed	18.04.2017 13:56
Completed	18.04.2017 13:53

Fig. 34. Sample list as a table

The "Samples" dialogue consists of three parts:

- Samples window;
- Samples filters;
- Quantitative information: total number of sample and the number of the selected sample.

Samples can be displayed as a table or as a gallery. To enter the gallery mode, click the "Samples" button on the "Main" ribbon and select "Gallery".

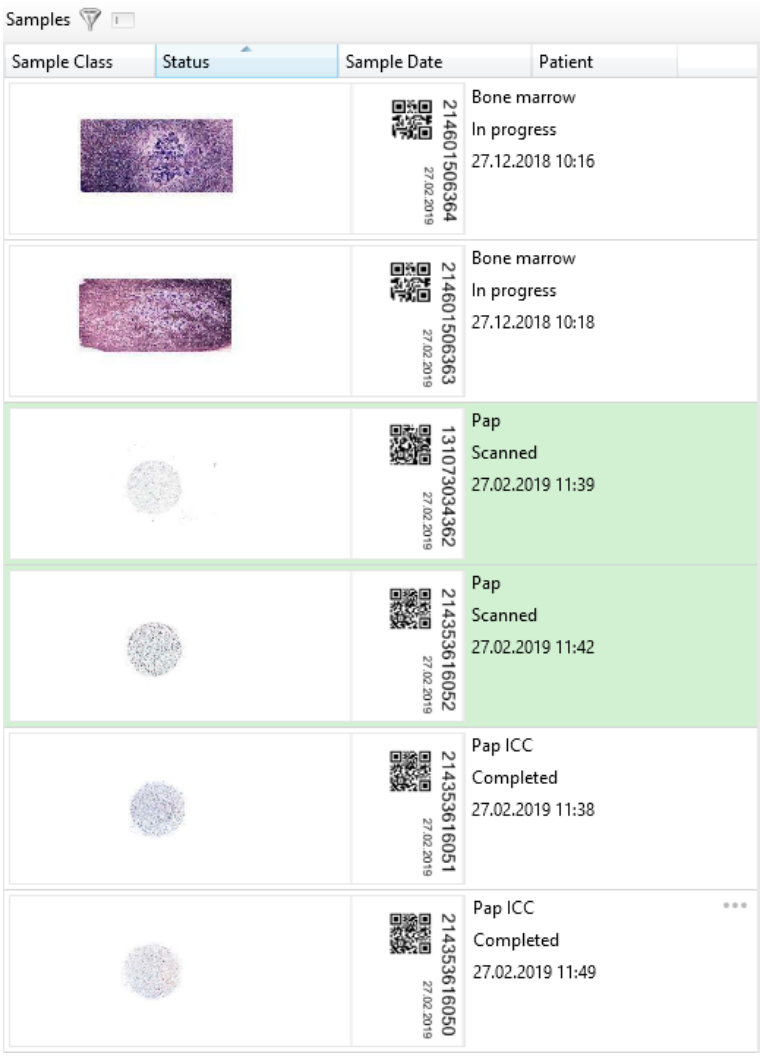


Fig. 35. Sample list as a gallery

Hovering the mouse cursor over a sample will display the button. Clicking on it will display the sample data.

Samples may have one of the following statuses:

- "New" — new sample for scanning, not marked with any color by default;
- "Scanned" — scanning has finished successfully;
- "Delayed" — sample is removed from the queue;
- "Scanning" — scanning is in progress;
- "Pausing" — intermediate status preceding "Pause";
- "Pause" — scanning of the sample has been paused, the sample stays in the queue for scanning;
- "Stopping" — intermediate status preceding "In progress";
- "In progress" — the sample is returned to the queue for scanning;
- "Error" — an error has occurred during scanning. Hover the mouse cursor over to display detailed information. Click the "Completed" button to finish the work with this sample;
- "Completed" — set by a user when work is finished, cells cannot be classified manually in this sample.

Depending on the status, samples may be highlighted with a color. The color is configured in the settings.

With the active LIS communication a new field “LIS” appears in the table of samples, containing the status of the LIS communication. This field may content the following statuses:

- “Sending result” — data are being sent to the LIS. Sending of the results starts automatically with changing the sample status to “Complete”, if this function is checked in the settings, or manually with the “Export” button;
- “Result sent” — data are successfully sent to the LIS;
- “Data request” — Vision sent a request to update sample attributes data (Sample Date, Patients, etc.). Data request can be sent manually by clicking the “Import” button or automatically when receiving a sample via barcode or from a blood analyzer;
- “Linked” — this sample has been updated according to the LIS data;
- “Waiting order and sending result” — sending of results and expecting an order processing at the same time;
- “None” — sample has been added to a patient in the Vision and not yet exported to the LIS.

Information about additional icons

- “Microscopy” — displayed in the additional “Microscopy” column and appears if the sample contains microscopy data;
- “Reference ranges” — displayed in the additional “Flag” column and appears if the values are out of the reference range. Work with and without attaching to patient;
- "Reference range is unknown" — displayed in the additional "Flag" column and appears after changing the sample values when calculating the reference range.
- “Preclassification mode” — displayed in the additional “Preclassification mode” column and appears when the preclassification mode is enabled;
- “Sample sent” — displayed in the additional “Sample sent” column and appears when the sample is sent to Vision server.

You can quickly arrange samples by a field by left-clicking on the field’s name (Fig. 12). One click arranges the list in direct order; the second click does in reverse order. The auxiliary arrow next to the field’s name shows the arrangement order.

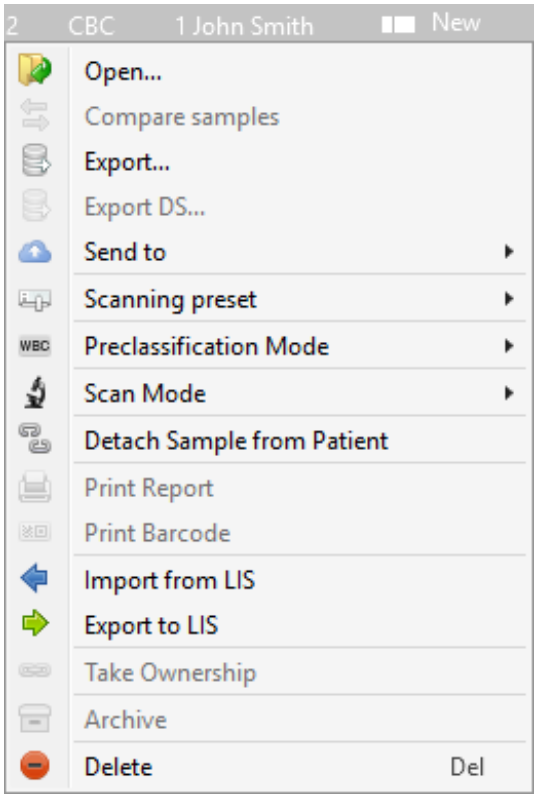


Fig. 36. Sample's context menu

The context menu is activated by right-clicking a sample in the "Samples" tab. The context menu has six options:

- "Open…" — opens the sample editor;

"Compare samples" compares two samples. Available for CBC[18], BF[18], Cyto[18], CSS[18], Pap[18], Pap ICC[18], STDs[18], Histo[18];

- "Export…" — exports the chosen samples and saves all associated data;

Attention!

Export of patients must be disabled before exporting the samples, if you plan to hand over the data to other persons, e.g. a developer.

- "Export DS…" — exports the chosen DS;
- "Send to" — sends the sample to the Vision server, only active when configured in the Vision Database Manager. Allows selecting the needed address;
- "Scanning Preset" — only active for non-scanned samples. Allows to select a previously saved preset for a sample;

Attention!

Scanning presets from previous versions are not supported.

- "Preclassification Mode" — allows setting the pre-classification mode manually for a particular sample:
  - "Normal";

[18] Depends on delivery package

  - “Pathology”;
- “Scan mode” — scanning mode selection;
  - “Manual”;
  - “Automatic”;
- “Find Patient” — used in the “Show all” mode to find the patient to which the selected sample is attached to;
- “Detach Sample from Patient” — active only when a sample is attached to a patient and is used to detach a sample from a specific patient;
- “Print Report” — generates a sample report;
- “Print Barcode” — allows to print a barcode for selected sample; active only when a barcode printer is connected;

Attention!

All ID parameters combined should not exceed 40 symbols.

- “Import from LIS” — sends a request to the LIS to update patient’s data, displayed only with the active bidirectional LIS communication;
- “Export to LIS” — sends renewed data of sample results to the LIS, displayed only with the active LIS communication;
- “Take ownership” — allows to attach a sample to the current workstation;
- “Archive” — moves the sample with “Completed” status to the archive;
- “Delete” — deletes a sample.

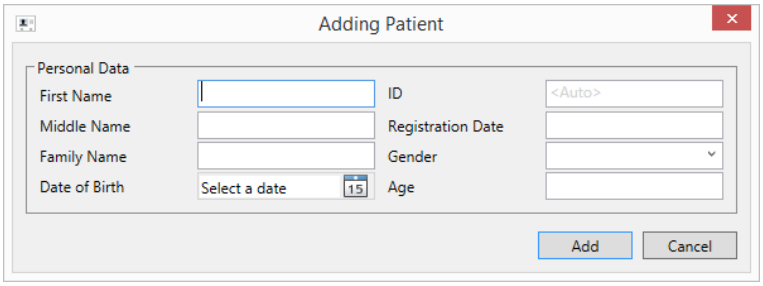


Fig. 37. Adding a patient from a sample panel

A patient may be added to a sample from the list of samples by clicking on the “Add” button in the empty patient field. After clicking the button, you will see a window where you need to input the patient’s data. The columns in the patients’ panel define the data fields.

Attention!

To access the patient’s personal data in the server DB, you need to enable the “GDPR Approved” parameter in the Vision Database Manager application.

5.4.7 Results

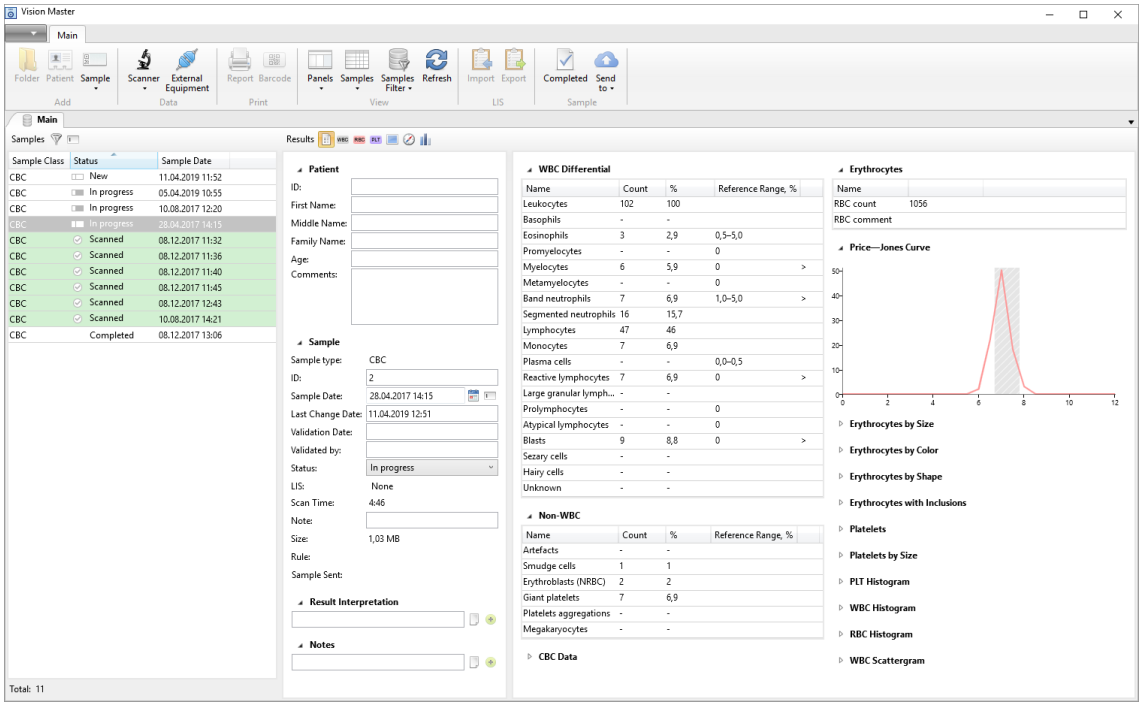


Fig. 38. Selection of review mode for sample examination results

Depending on the sample type you can select one of several review modes in the main window.

"CBC" sample[19]:

- — Sample examination results — sample attributes and tables containing quantitative data on found cells;
- WBC — Leukocytes — gallery with two panels: treelike structure with cell types and grouped images. There may be several panels with images;
- RBC — Erythrocytes — gallery with two panels: information about the identified erythrocytes and images. The Extended mode displays grouped cells;
- PLT — Platelets — gallery with two panels. The left part displays information about the amount and classification of platelets. The right part displays full frames, captured while scanning. The Extended mode displays grouped cells;
- — Full frames — frames manually captured by the user;
- — Navigator — scheme of slide with colored markers for cells types;
- — Morphological analysis allows getting statistical information on a certain cell type and adding it to the report.

"RET" sample[19]:

- — Sample examination results — sample attributes and tables containing quantitative data on found cells;
- — Sample view — gallery with two modes: cells in the field of view and grouped cells with the atlas access.

"Bone marrow" sample[19] after slide scanning:

- — Sample examination results — sample attributes and tables containing quantitative data on found cells;
- 10x — 10x sample — digital sample viewing;

[19] Depends on delivery package

- 100x — Sample view — gallery with two modes: cells in the field of view and grouped cells with the atlas access.
- — MGK and AC full frames — frames with megakaryocytes and abnormal cells;
- — Navigator — scheme of the slide with colored markers for cells types.

“Bone marrow” sample[20] after importing a digital slide:

- — Sample examination results — sample attributes and tables containing quantitative data on found cells;
- 100x — Sample view — digital sample or gallery with three modes: cells in the field of view, grouped cells and Multi View with the atlas access.

“BF”[20], “Cytology”[20], “CSS”[20], “Pap”[20], “Pap ICC”[20], “STDs”[20], “Histo”[20] samples

- — Sample examination results — sample attributes and tables containing quantitative data on found cells;
- — Sample view — digital sample or gallery with three modes: cells in the field of view, grouped cells and Multi View with the atlas access.

“Hemoparasites” samples[20]:

- — Thick blood smear — sample attributes, tables containing data on found cells and a gallery with the frames captured while scanning the thick smear;
- RBC — Thin blood smear — display of cells found while scanning a thin smear;

Attention!

“BF: Exudates” sample is no longer supported. All samples created in the previous versions will be removed.

The sample attributes panel is displayed along with the sample examination results panel.

5.4.7.1 *Error information*

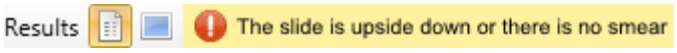


Fig. 39. Error information

When an error occurs, the “Results” panel displays detailed information about it. Click “Completed” to finish the work with this sample.

[20] Depends on delivery package

5.4.7.2 *Sample Attributes*

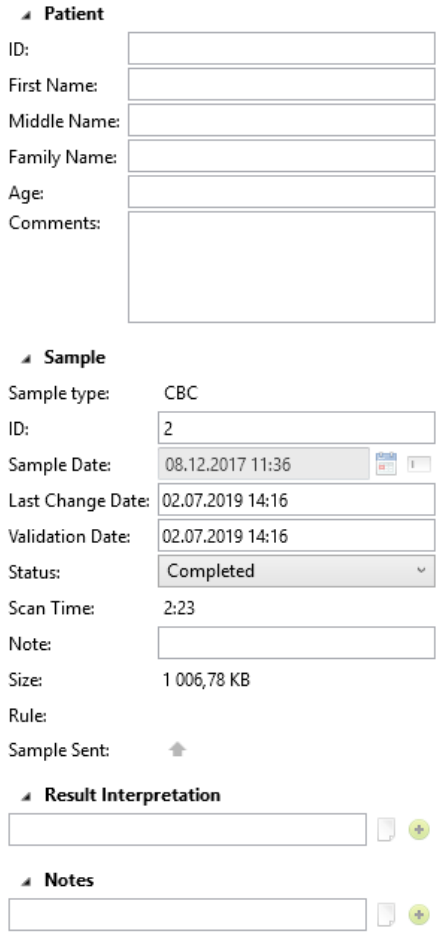


Fig. 40. “Sample Attributes” panel

The panel consists of the following groups and options:

- “Patient” group contains uneditable information from the “Patient” section;
- “Sample” group contains parameters related to sample;
  - “Sample type” — type of a sample;
  - “ID” — editable field;
  - “Sample Date” — allows to set the date and time of sampling; sets automatically when a sample is created;
  - “Last Change Date” — allows to set date and time of the sample; changes automatically when:
    - Sample scanning is started;
    - Sample status is changed to “Error”;
    - Sample status is changed to “In Progress”;
    - Sample status is changed to “Delayed”.
  - “Validation Date” — a date of the sample validation; sets automatically, when the sample status changes to “Completed”;
  - “Validated by” — the user that set the sample’s status to “Completed”;
  - “Status” — current sample status;
  - “LIS” — current LIS communication status;
  - “Scan Time” — time of scanning;
  - “Note” — editable field of notes;
  - “Size” — sample data size;

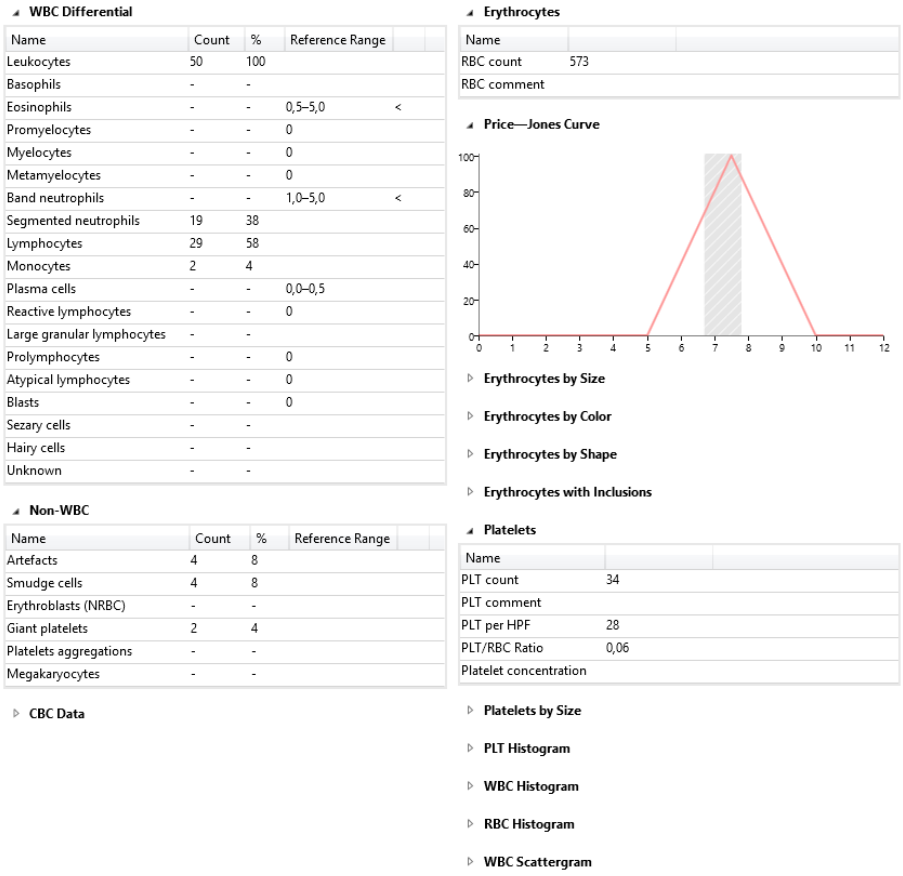
- “Rule”[21] — applied data processing rule;
- “Sample sent” — Vision server communication status;

- “Sample attributes” — editable parameters of sample attributes, set in the Reference;
- “Result Interpretation” — editable field;
- “Notes” — editable field.

You can add new attributes using the “Sample Attributes” reference. To change the group order, click and hold the left mouse button on the group’s name and move using the mouse.

5.4.7.3 *CBC*[21]

5.4.7.3.1 Sample Results



WBC Differential

Name	Count	%	Reference Range	
Leukocytes	50	100		
Basophils	-	-		
Eosinophils	-	-	0,5–5,0	<
Promyelocytes	-	-	0	
Myelocytes	-	-	0	
Metamyelocytes	-	-	0	
Band neutrophils	-	-	1,0–5,0	<
Segmented neutrophils	19	38		
Lymphocytes	29	58		
Monocytes	2	4		
Plasma cells	-	-	0,0–0,5	
Reactive lymphocytes	-	-	0	
Large granular lymphocytes	-	-		
Prolymphocytes	-	-	0	
Atypical lymphocytes	-	-	0	
Blasts	-	-	0	
Sezary cells	-	-		
Hairy cells	-	-		
Unknown	-	-		

Non-WBC

Name	Count	%	Reference Range
Artefacts	4	8	
Smudge cells	4	8	
Erythroblasts (NRBC)	-	-	
Giant platelets	2	4	
Platelets aggregations	-	-	
Megakaryocytes	-	-	

CBC Data

Erythrocytes

Name	
RBC count	573
RBC comment	

Price—Jones Curve

Erythrocytes by Size

Erythrocytes by Color

Erythrocytes by Shape

Erythrocytes with Inclusions

Platelets

Name	
PLT count	34
PLT comment	
PLT per HPF	28
PLT/RBC Ratio	0,06
Platelet concentration	

Platelets by Size

PLT Histogram

WBC Histogram

RBC Histogram

WBC Scattergram

Fig. 41. “Sample Results” window

The “Sample Results” window includes the following tables:

- WBC differential;
- Non-WBC;
- CBC Data;
- Erythrocytes;
- Erythrocytes by size;
- Erythrocytes by color;
- Erythrocytes by shape;
- Erythrocytes with inclusions;
- Platelets;
- Platelets by size.

It also contains a “Price-Jones Curve” graph, WBC, RBC, PLT histograms and scattergrams.

[21] Depends on delivery package

5.4.7.3.2 Leukocytes

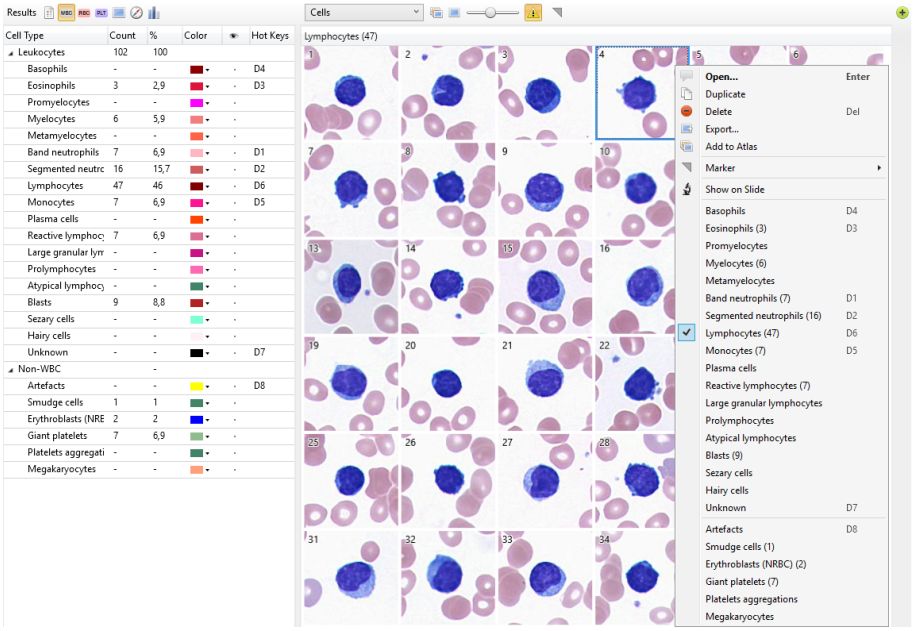


Fig. 42. “Leukocytes” panel

The leukocytes gallery is divided into two panels: a tree structure panel and a panel that contains images. There can be several panels with images (added for an easier viewing and validation). The scanned images are identified and grouped by cell type: leukocytes and non-WBC.

To change the cell type, open the context menu and select a different cell type.

To delete a saved frame, right-click on a frame and select “Delete”, or select a frame and press the “Delete” button on the keyboard.

Attention!

When selecting the “Show on slide” option, the slide placed in the microscope should correspond to the sample you are working with. In case of a mismatch the study results of different samples may be mixed up.

Attention!

Simultaneous operation of sample scanner and change to sample pre-classification requires GeForce GTX x60 video card with at least 6 GB of video memory.

5.4.7.3.3 Erythrocytes

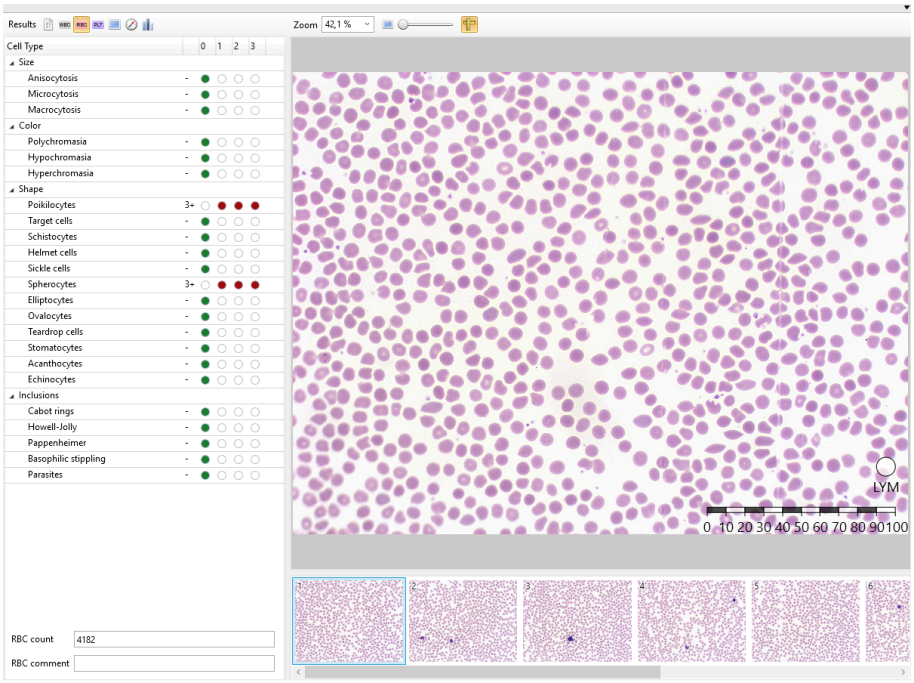


Fig. 43. “Erythrocytes” panel

The erythrocytes gallery is divided into two sections: information about the detected erythrocytes and the images of the detected objects.

Attention!

When selecting the “Show on slide” option, the slide placed in the microscope should correspond to the sample you are working with. In case of a mismatch the study results of different samples may be mixed up.

To assess erythrocytes morphology by the size on the image, use the following interface tools: "Ruler" and "Small lymphocyte".

5.4.7.3.3.1 *Extended mode*[22]

The extended mode is activated in the dongle. There is the “Enable Extended Mode” button in the lower part of the information panel. In this mode erythrocytes are automatically analyzed after the scanning and sorted according to their type.

There are two display options for the extended mode gallery.

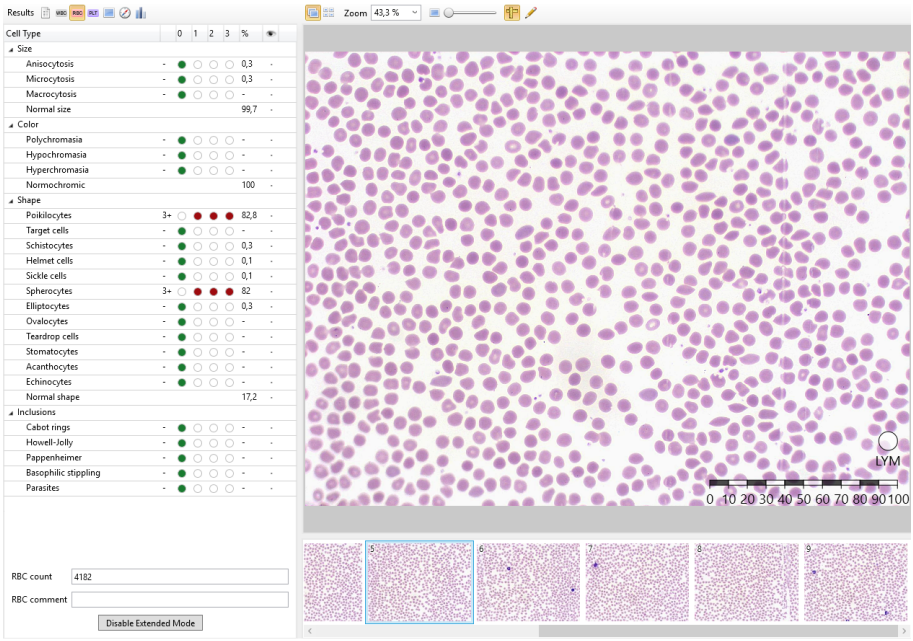


Fig. 44. Extended mode — cells on the frame

1. Cells on the frame — display of cells in the field of view. The following tools are available in this mode:

- Zoom;
- Ruler;
- Editor — highlights cells with areas (inaccessible for samples with “Completed” status);
- Help — moving the cursor over a cell displays a prompt with related information.

[22] Depends on delivery package

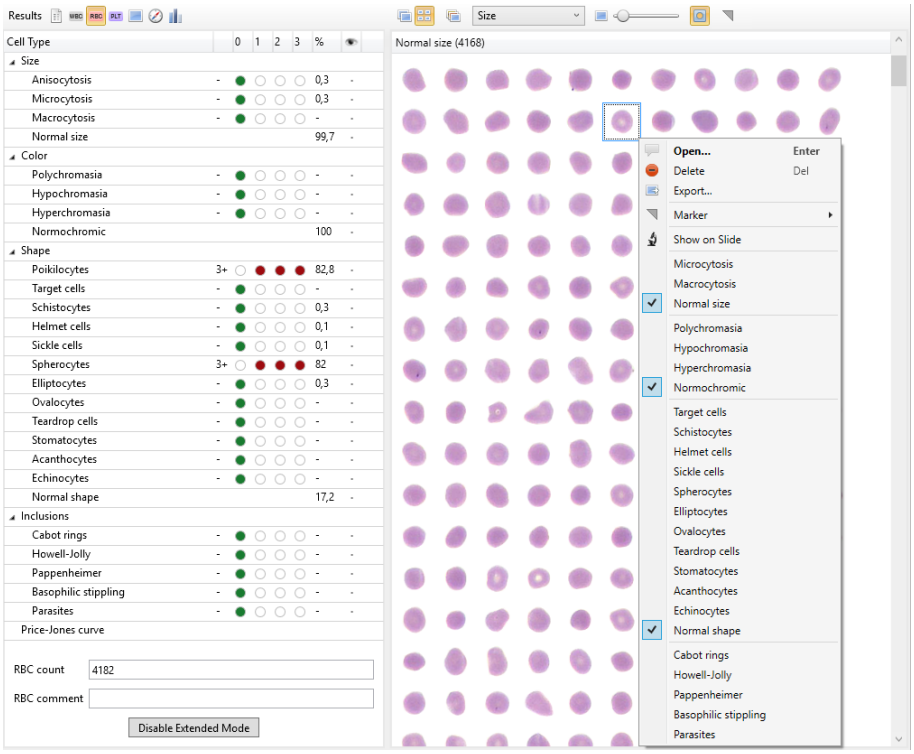


Fig. 45. Extended mode — grouped cells

2. Grouped cells — displays all cells separately. The following tools are available in this mode:

- Atlas;
- Drop-down list for sorting of cells:
  - Size;
  - Color;
  - Shape;
  - Inclusions.
- Zoom;
- Show masks;
- Show marked;
- Help — moving the cursor over a cell displays a prompt with related information.

You can add cell images to the atlas by dragging them from the gallery to the corresponding cell type area in the atlas.

To exit the Extended mode and switch to changing the scanning results, click “Disable Extended Mode”.

Important!

When exiting the Extended mode, all information obtained during automatic analysis of cells will be lost.

5.4.7.3.4 Platelets

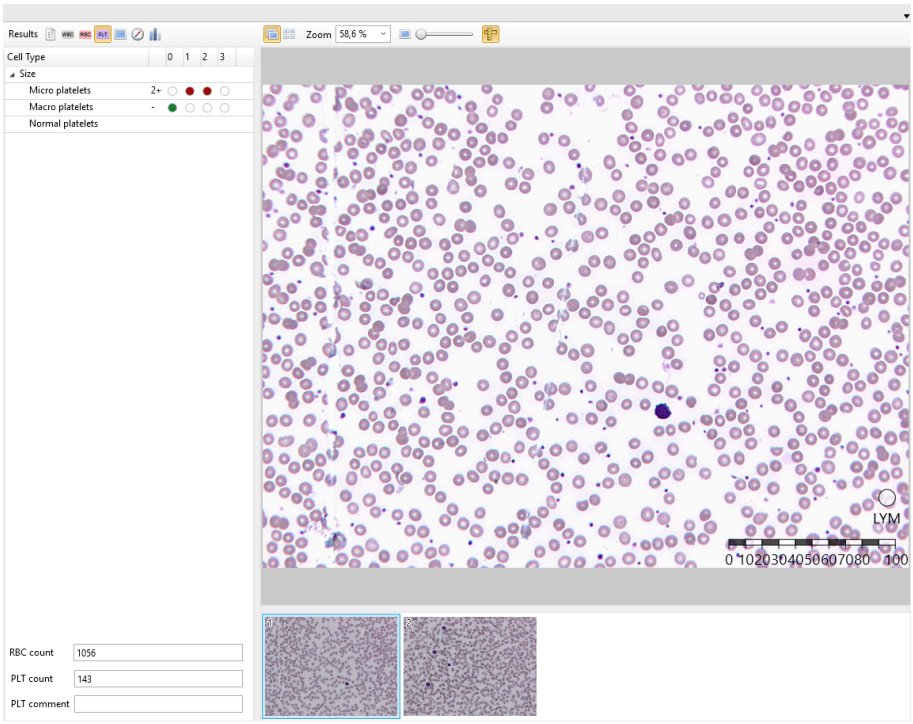


Fig. 46. “Platelets” panel

The platelets gallery is divided into two parts. The left section contains the information about the number and classification of platelets. The right section contains the frames collected in the course of scanning.

Attention!

When selecting the “Show on slide” option, the slide placed in the microscope should correspond to the sample you are working with. In case of a mismatch the study results of different samples may be mixed up.

5.4.7.3.4.1 *Extended mode*[23]

In this mode platelets are automatically analyzed after the scanning and sorted according to their type.

Important!

When importing samples from Vision 1.12 with Extended RBC to later versions with Extended RBC and Extended PLT and upon updating the application, the PLT data are reset.

There are two display options for the extended mode gallery.

[23] Depends on delivery package

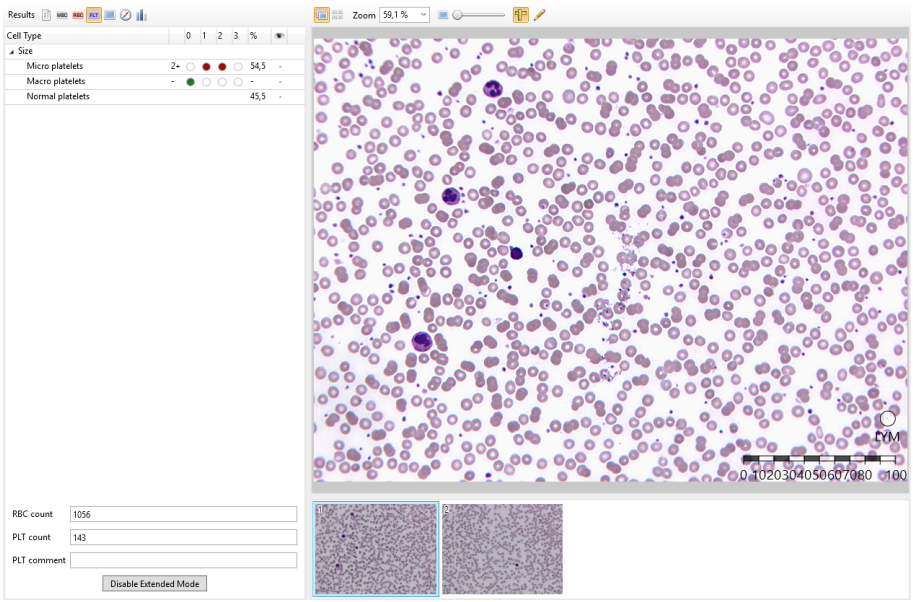


Fig. 47. Extended mode — cells on the frame

1. Cells on the frame — display of cells in the field of view. The following tools are available in this mode:

- Zoom;
- Ruler;
- Editor —highlights cells with areas (inaccessible for samples with “Completed” status);
- Help — moving the cursor over a cell displays a prompt with related information.

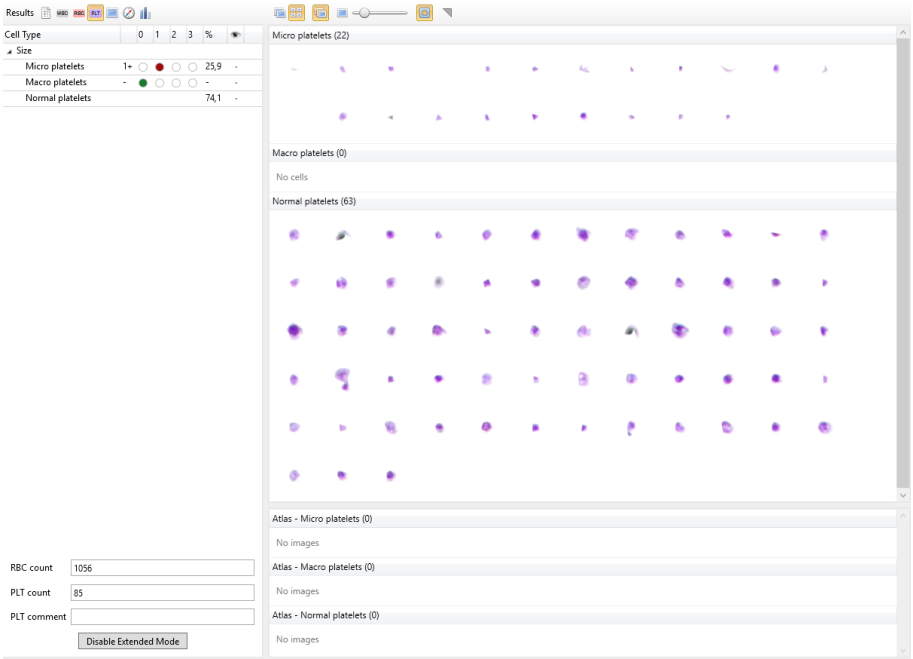


Fig. 48. Extended mode — grouped cells

2. Grouped cells — displays all cells separately. The following tools are available in this mode:

- Atlas;
- Zoom;
- Show masks;
- Show marked;
- Help — moving the cursor over a cell displays a prompt with related information.

To exit the Extended mode and switch to changing the scanning results, click “Disable Extended Mode”.

Attention!

When exiting the Extended mode, all information obtained during automatic analysis of cells will be lost.

5.4.7.3.5 Full Frames

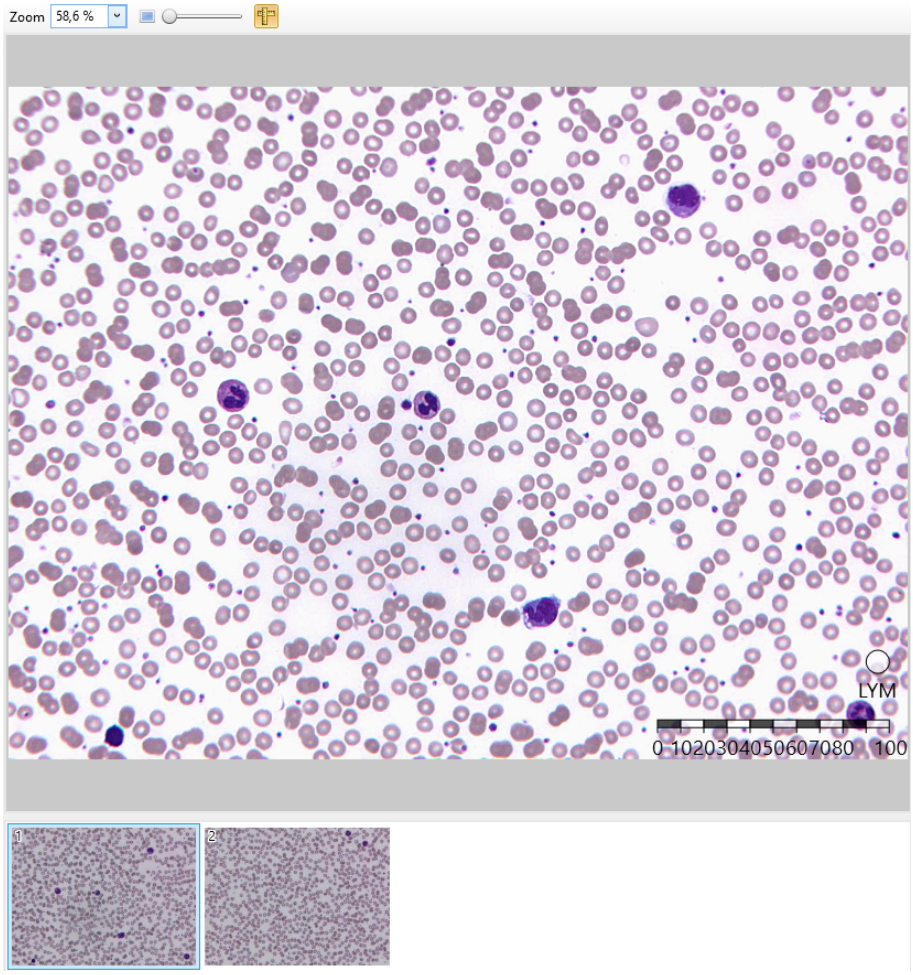


Fig. 49. “Full Frames” panel

The “Full Frames” mode displays the images manually saved by the user. Zoom and Ruler tools are available in this mode.

Attention!

When selecting the “Show on slide” option, the slide placed in the microscope should correspond to the sample you are working with. In case of a mismatch the study results of different samples may be mixed up.

5.4.7.3.6 Navigator

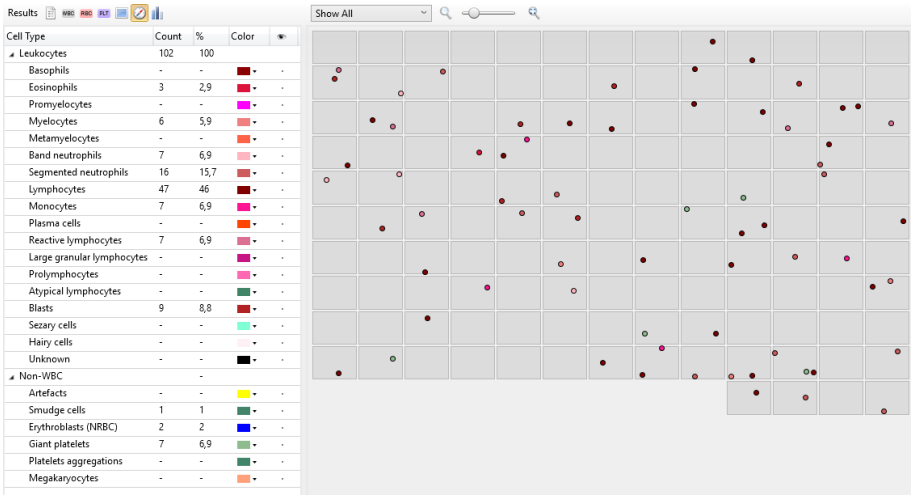


Fig. 50. “Navigator” window

This mode allows observing what kind of cell types have been detected in different areas. For this purpose, different cell types are marked with different colors.

Right-clicking on a dot that represents a saved cell summons the context menu.

Attention!

When selecting the “Show on slide” option, the slide placed in the microscope should correspond to the sample you are working with. In case of a mismatch the examination results of different samples may be mixed up.

5.4.7.3.7 Morphological Analysis

The Morphological analysis allows obtaining statistics on a specific cell type and adding it to the report.

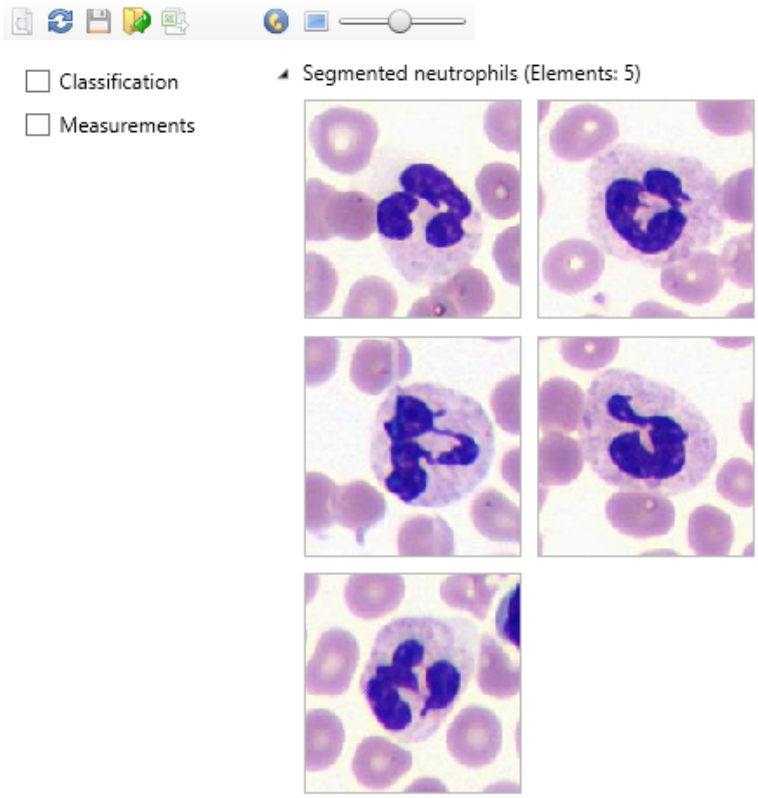


Fig. 51. “Morphological Analysis” window

On the left panel you can select a cell type for the sample:

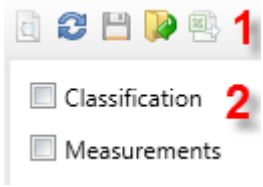


Fig. 52. Cell type analysis

The middle panel of the morphological analysis contains the following groups:

1) Control elements:
    a) “Make Report” — generates a report on the conducted analysis;
    b) “Reset” — resets the analysis settings;
    c) “Save” — saves classification parameters to a file;
    d) “Load” — loads the classification parameters from a previously saved file;
    e) “Export Measurements” — exports selected measurement values into the file. This element becomes active if the number of cells that require the display of measurements is greater than 70.
2) Selection of the analysis method: “Classification” and/or “Measurements”.

Attention!

When selecting the “Show on slide” option, the slide placed in the microscope should correspond to the sample you are working with. In case of a mismatch the study results of different samples may be mixed up.

5.4.7.4 *RET*[24]

5.4.7.4.1 Sample Results

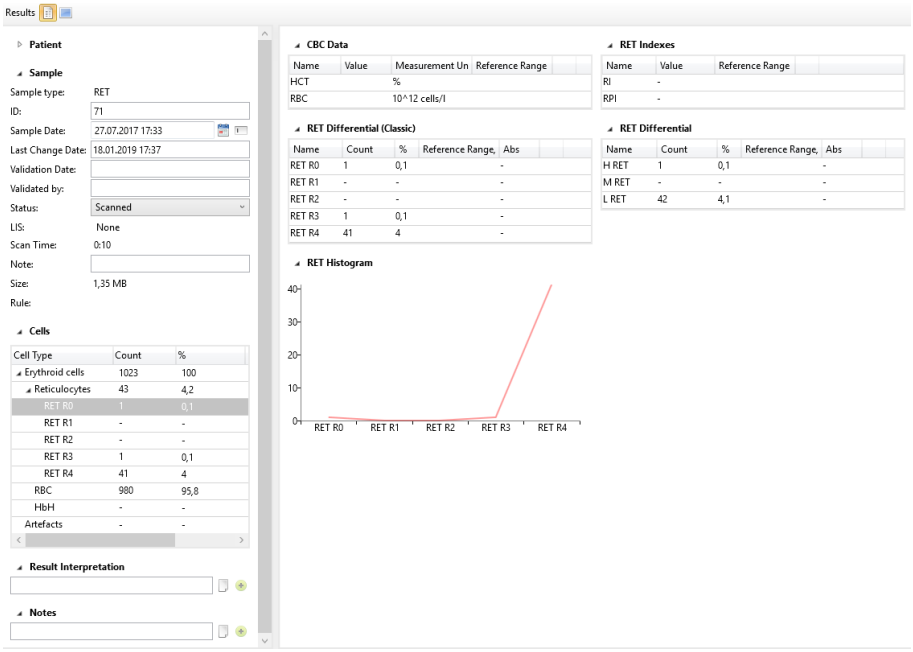


Fig. 53. RET sample examination results

Sample attributes include an additional “Cells” group.

The following tables are presented in the “Sample examination results” window:

- CBC data;
- RET differential (Classic);
- RET histogram;
- RET indexes;
- RET differential.

[24] Depends on delivery package

5.4.7.4.2 Sample viewing

Samples can be viewed in two modes.

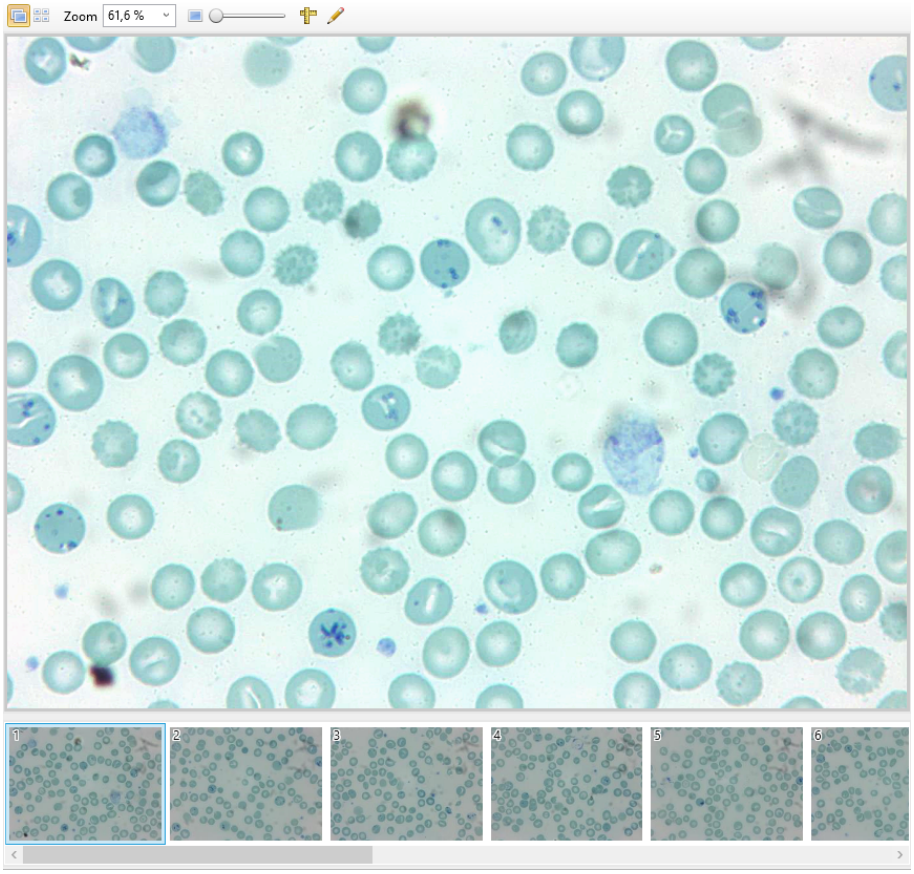


Fig. 54. “Sample view” panel — cells on the frame

1. Cells on the frame — display of cells in the field of view. The following tools are available in this mode:

- Zoom;
- Ruler;
- Editor —highlights cells with areas (inaccessible for samples with “Completed” status).

Fig. 55. “Sample view” panel — grouped cells

2. Grouped cells — displays all cells separately. The following tools are available in this mode:

- Atlas;
- Zoom;
- Show masks;
- Show marked.

5.4.7.5 *Bone marrow*[25]

5.4.7.5.1 Sample examination results

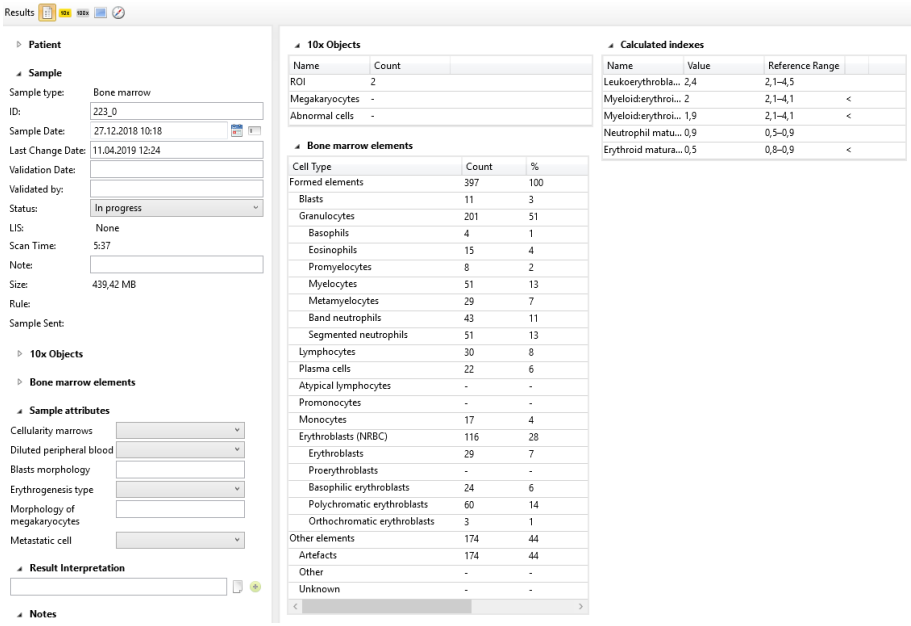


Fig. 56. Bone marrow sample examination results

The “Sample examination results” window contains the following tables:

- Bone marrow elements;
- Calculated indexes;
- 10x objects;

Sample attributes for “Bone marrow” samples include additional elements.

5.4.7.5.2 Sample 10x

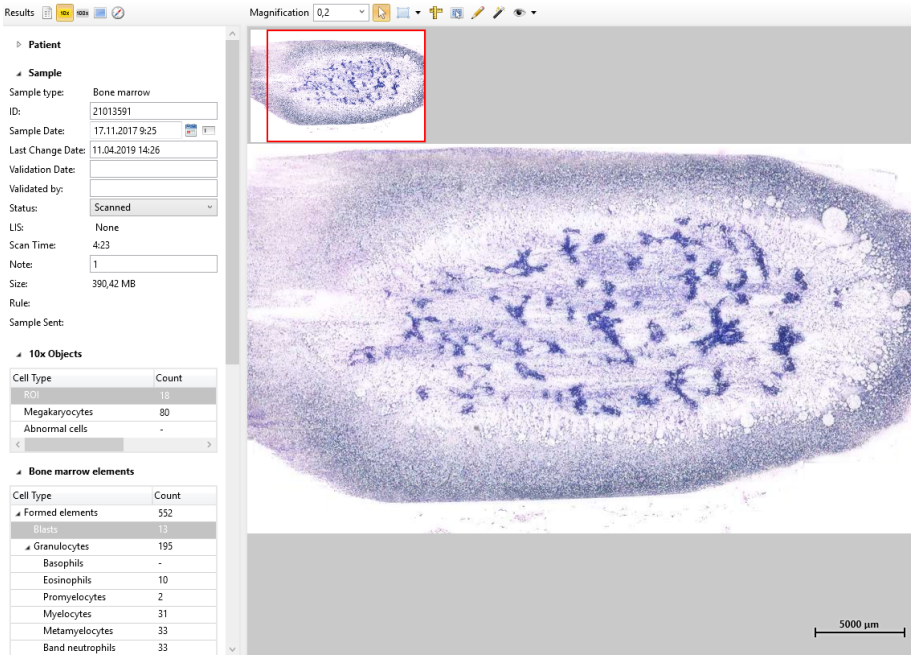


Fig. 57. “Sample 10x” panel

The following tools are available here:

- Zoom;

[25] Depends on delivery package

- Selector/Hand — selector mode: hold “Ctrl” and select an area with objects; hand mode: hold the left mouse button and move across the slide;
- Annotation — use this option to draw elements (unavailable for samples with “Completed” status):
  - Rectangular area;
  - Ellipse;
  - Polygonal chain;
  - Polygon;
  - Line segment;
  - Pointer;
- Ruler — hold the left mouse button for measurement;
- Save Image — saving the selected area or the whole slide to a folder;
- Editor —highlights cells with areas (unavailable for samples with “Completed” status).
- Select objects by color — you can edit mask parameters in the “Color mask wizard” window, objects generated by color will be added to the cell gallery (unavailable for samples with “Completed” status);

Attention!

The number of objects that can be added to the object gallery using the “Color mask wizard” is limited to 10000.

- “View” drop-down list — displays tools and objects on the slide:
  - Thumbnail;
  - Tracing — displays tracing on the thumbnail;
  - Preview — enlarged image of the slide area under the cursor;
  - Label — displays the label if available;
  - Scale — displays the scale ruler;
  - Annotations;
  - Objects.

When using the ruler, editor or the color selection tool you can zoom the image in and out with the mouse wheel while holding the “Space” key on the keyboard.

5.4.7.5.3 100x sample viewer

When importing a digital slide into a “Bone marrow” sample, 100x sample viewer is the same as in section 5.4.7.6.2.

Viewing of a scanned sample is described below.

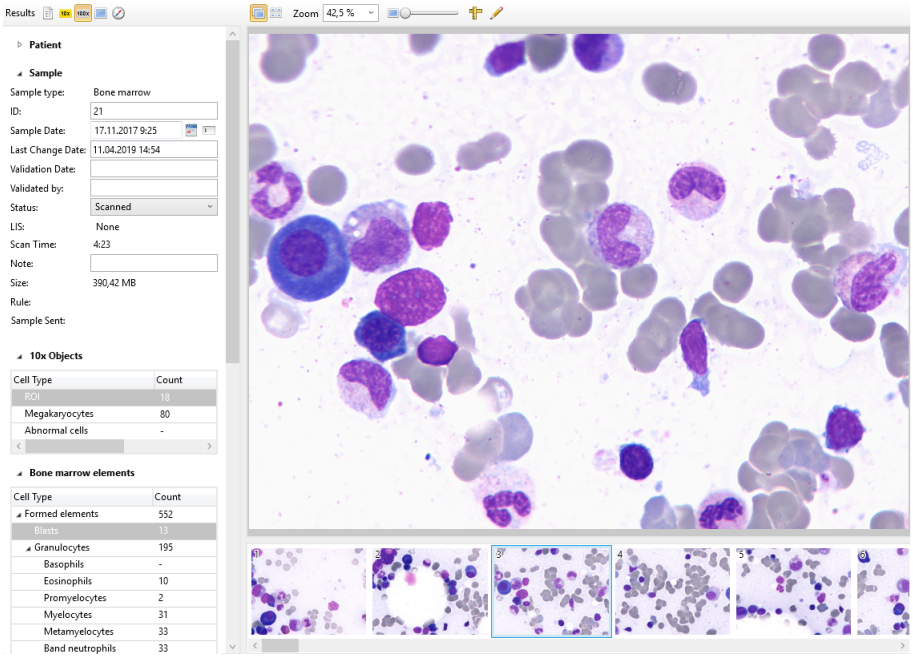


Fig. 58. “100x sample viewer” panel — cells on the frame

This panel has two viewing modes:

1. Cells on the frame. The following tools are available in this mode:

- Zoom;
- Ruler;
- Editor — highlights cells with areas (unavailable for samples with “Completed” status).

Full frames captured in the previous versions of Vision are supported but cells won’t be displayed on them.

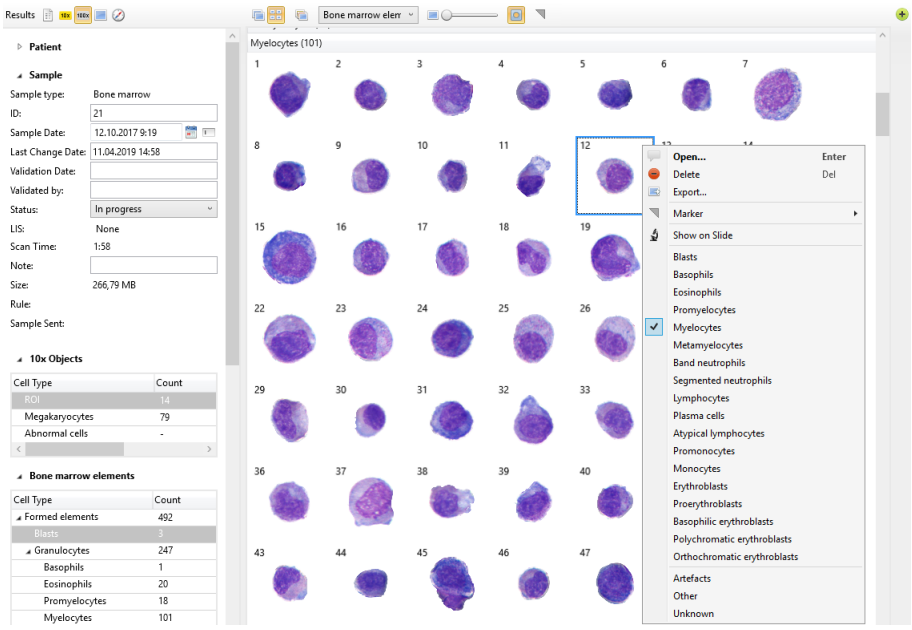


Fig. 59. “100x sample viewer” panel — grouped cells

2. Grouped cells — displays each cell separately. Scanned images are grouped by identified cell types. Right-clicking a cell summons its context menu. The following tools are available in this mode:

- Atlas with examples of cell types;
- Zoom;
- Show masks;
- Show marked;
- Add representation.

Attention!

When selecting the "Show on slide" option, the slide placed in the microscope should correspond to the sample you are working with. In case of a mismatch the study results of different samples may be mixed up.

5.4.7.5.3.1 *"Bone marrow" sample pre-classification*

Pre-classification function is available for "Bone marrow" samples.

Attention!

Simultaneous operation of sample scanner and change to sample pre-classification requires GeForce GTX x60 video card with at least 6 GB of video memory.

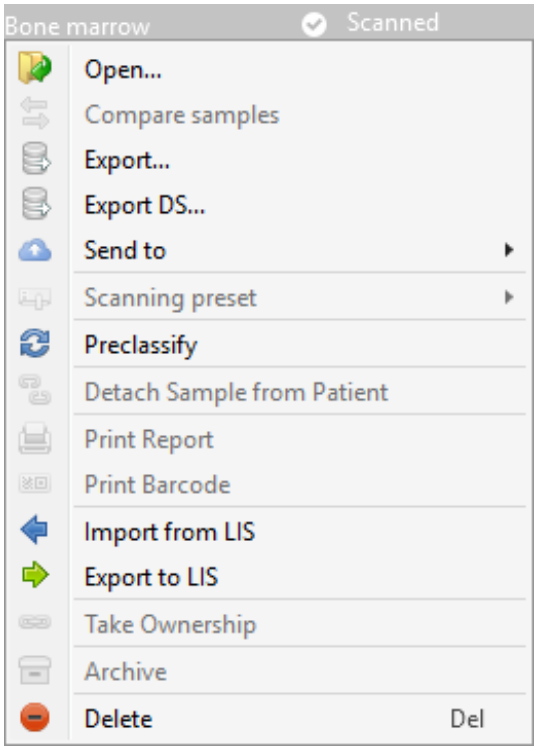


Fig. 60. Context menu of a "Bone marrow" sample

To update bone marrow elements classification results, select "Preclassify" in the sample's context menu and confirm it in the newly opened window.

5.4.7.5.4 MGK and AC[23] full frames

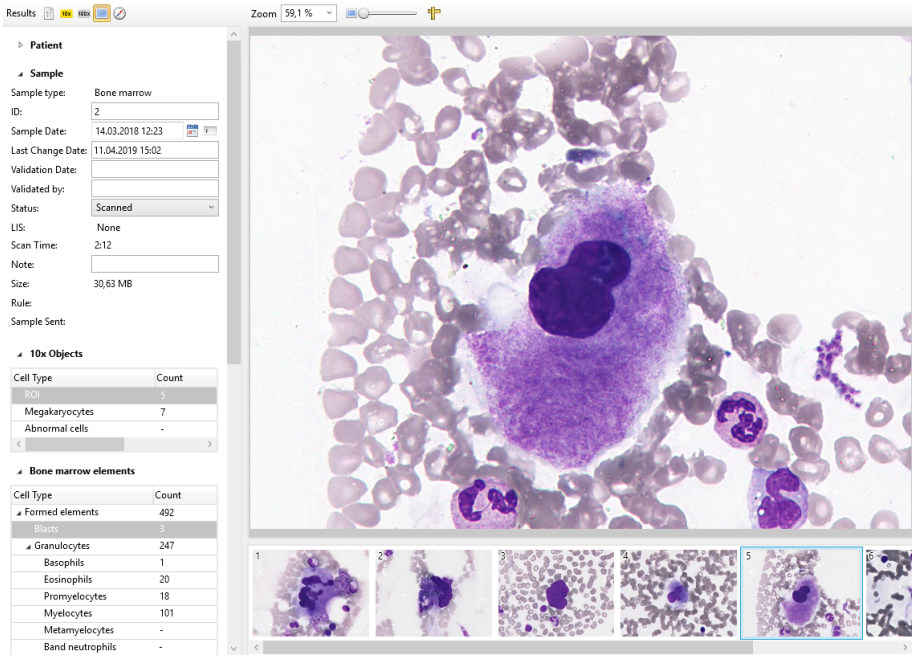


Fig. 61. “MGK and AC full frames” panel

The “MGK and AC full frames” window displays frames with megakaryocytes and abnormal cells, if the corresponding scanner setting is enabled.

5.4.7.5.5 Navigator

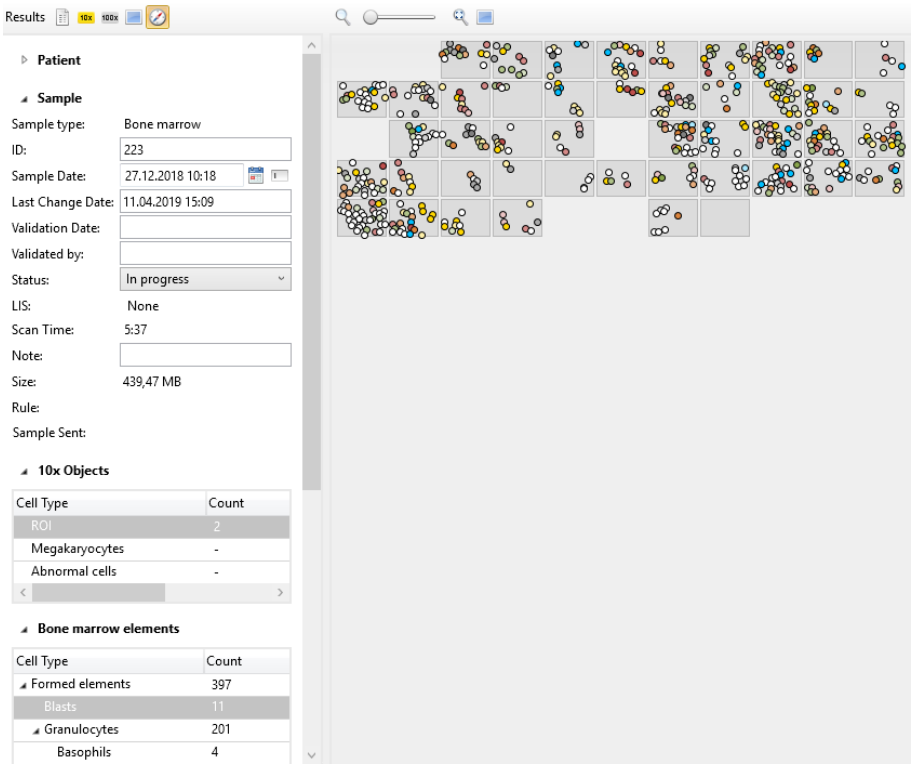


Fig. 62. Navigator

The navigator shows the location of cells by marking them with colors corresponding to their cell types. Frames without formed elements are not displayed. Right-clicking on a cell summons its context menu. The following tools are available in the navigator:

- Zoom;
- Image display.

5.4.7.6 *BF[26], Cytology[26], CSS6[26], Pap[26], Pap ICC[26], STDs[26], Histo[26-27]*

5.4.7.6.1 Sample examination results

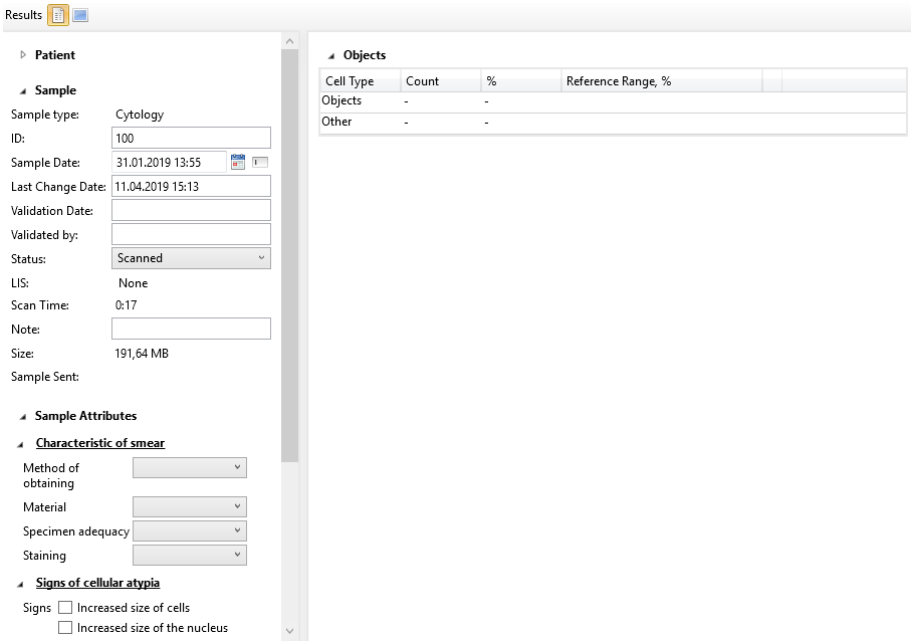


Fig. 63. Cytology sample examination results

Sample attributes for each sample type contain additional groups.

Sample examination results are presented in the “Objects” table.

Important![26]

Pap sample pre-classification is not an established diagnosis. User verification is required.

Pathological changes include the following:

ASC-US/AGC, ASC-H/AGC-FN, LSIL, HSIL/AIS, SCC/ADC.

PAT diagnostic sensitivity — 90.0 %

PAT diagnostic specificity — 87.1 %

[26] Depends on delivery package

[27] Also marketed under the name of Vision Slide

5.4.7.6.2 Sample viewing

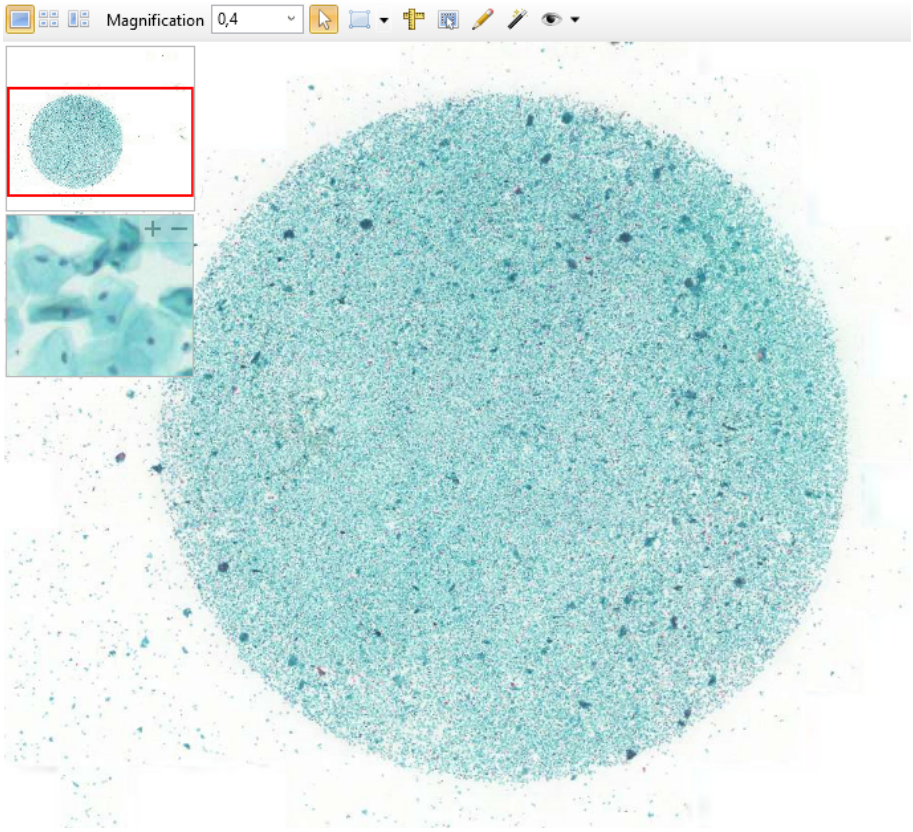


Fig. 64. “Sample view” panel — cell on the frame

Samples can be viewed in three modes.

1. Cells on the frame. New scanning format allows viewing the entire specimen. The thumbnail in the upper left corner shows the viewing position. The following tools are available in this mode:
   - Zoom;
   - Selector/Hand — selector mode: hold “Ctrl” and select an area with objects; hand mode: hold the left mouse button and move across the slide;
   - Annotation — use this option to draw elements (unavailable for samples with “Completed” status):
     - Rectangular area;
     - Ellipse;
     - Polygonal chain;
     - Polygon;
     - Line segment;
     - Pointer;
   - Ruler — hold the left mouse button for measurement;
   - Save Image — saving the selected area or the whole slide to a folder;
   - Editor —highlights cells with areas (unavailable for samples with “Completed” status)[28].
   - Select objects by color — you can edit mask parameters in the “Color mask wizard” window, objects generated by color will be added to the cell gallery (unavailable for samples with “Completed” status);

[28] Except for Cytology, CSS and Histo samples

Attention!

The number of objects that can be added to the object gallery using the "Color mask wizard" is limited to 10000.

- "View" drop-down list — displays tools and objects on the slide:
  - Thumbnail;
  - Tracing — displays tracing on the thumbnail;
  - Preview — enlarged image of the slide area under the cursor;
  - Label — displays the label if available;
  - Scale — displays the scale ruler;
  - Annotations;
  - Objects.

When using the ruler, editor or the color selection tool you can zoom the image in and out with the mouse wheel while holding the "Space" key on the keyboard.

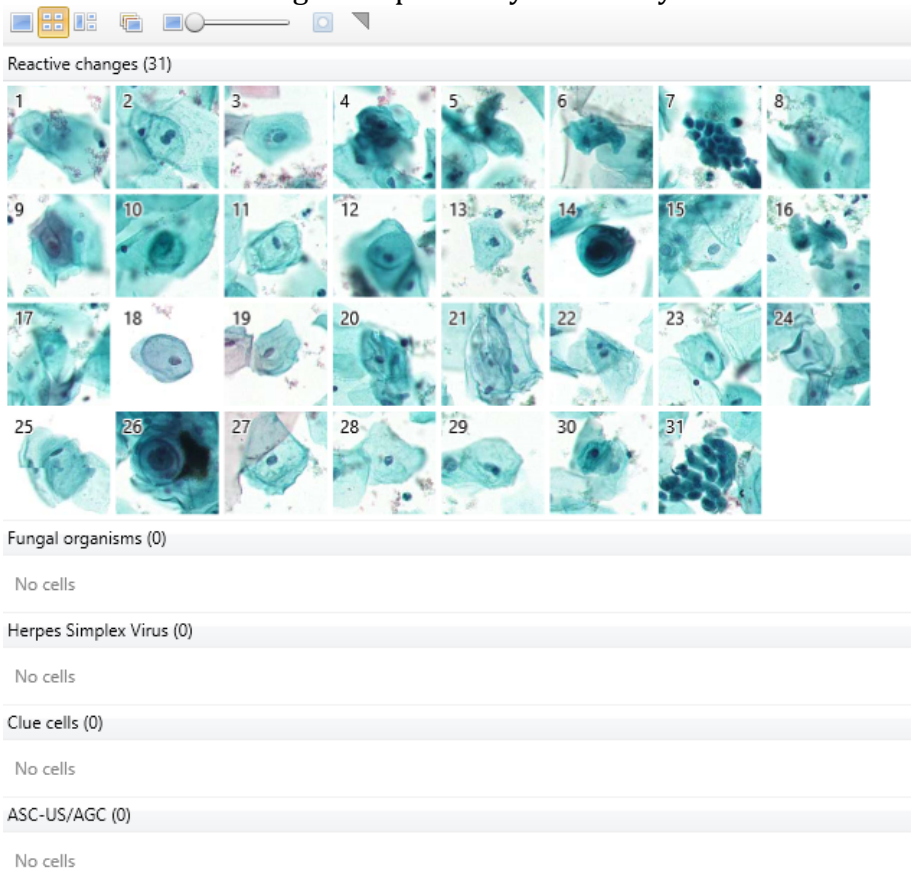


Fig. 65. "Sample view" panel — grouped cells

2. Grouped cells[29] — the mode is available when objects are present. Scanned images are grouped by identified cell types. The following tools are available in this mode:
   - Atlas with examples of cell types;
   - Zoom;
   - Show masks — highlighting of cell borders;
   - Show marked.

[29] Except for Cytology, CSS and Histo samples

Attention!

When selecting the “Show on slide” option, the slide placed in the microscope should correspond to the sample you are working with. In case of a mismatch the study results of different samples may be mixed up.

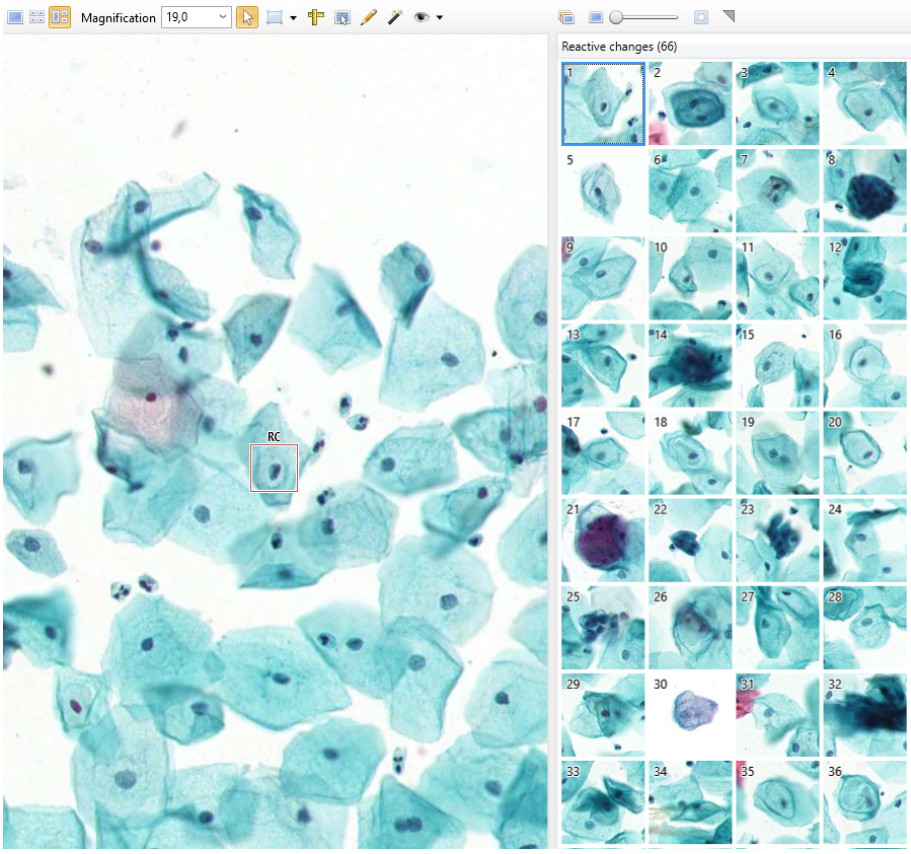


Fig. 66. “Sample view” panel — Multi View

3. Multi View[30] — the mode is available when objects are present. Synchronous operation of two previous modes: “Cells on the frame” and “Grouped cells”. A cell selected in the gallery is displayed on the slide and vice versa, a cell selected on the slide is found in the gallery. Functions of both modes are available.

[30] Except for Cytology, CSS and Histo samples

5.4.7.7 *Hemoparasites*[31]

5.4.7.7.1 Sample examination results

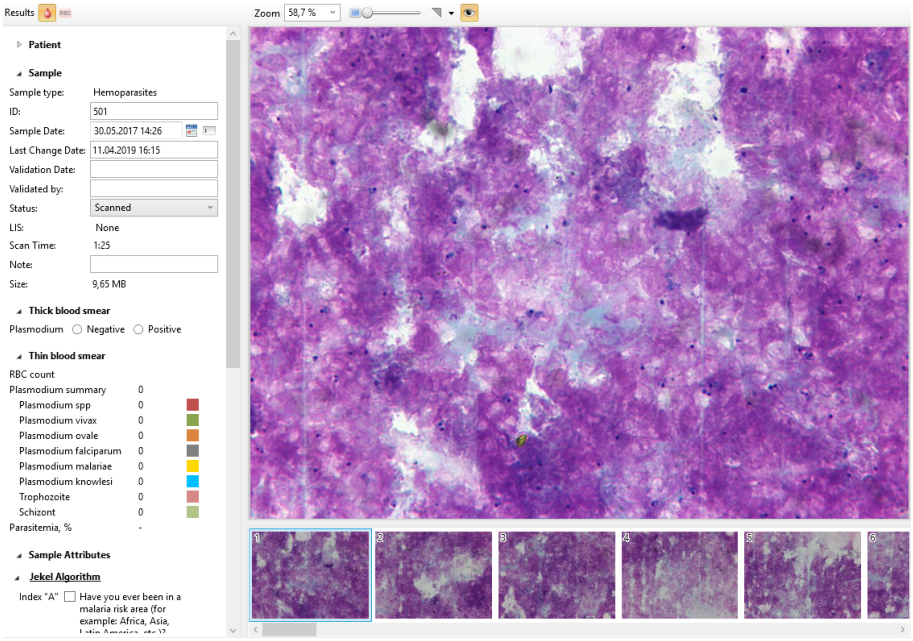


Fig. 67. Hemoparasites sample examination results

The “Sample examination results” window contains the following elements:

- Sample attributes;
- “Full frames” panel;
- Marker — click to mark the selected frame with a colored marker;
-  “Show all” — turns on/off the display mode that only shows the marked frames.

Sample attributes for “Hemoparasites” sample contain additional elements. “Hemoparasites” sample results may include examination results for a thick smear and for a thin smear.

[31] Depends on delivery package

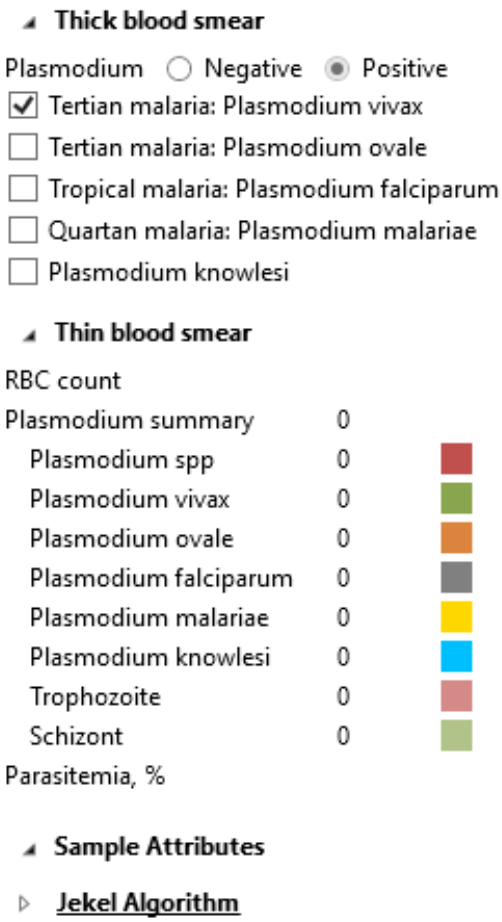


Fig. 68. Additional attributes

If a plasmodium is detected during the scanning of a thick smear you should put a corresponding flag in the sample attributes to display information about the scanning of a RBC thin smear.

5.4.7.7.2 Thin smear

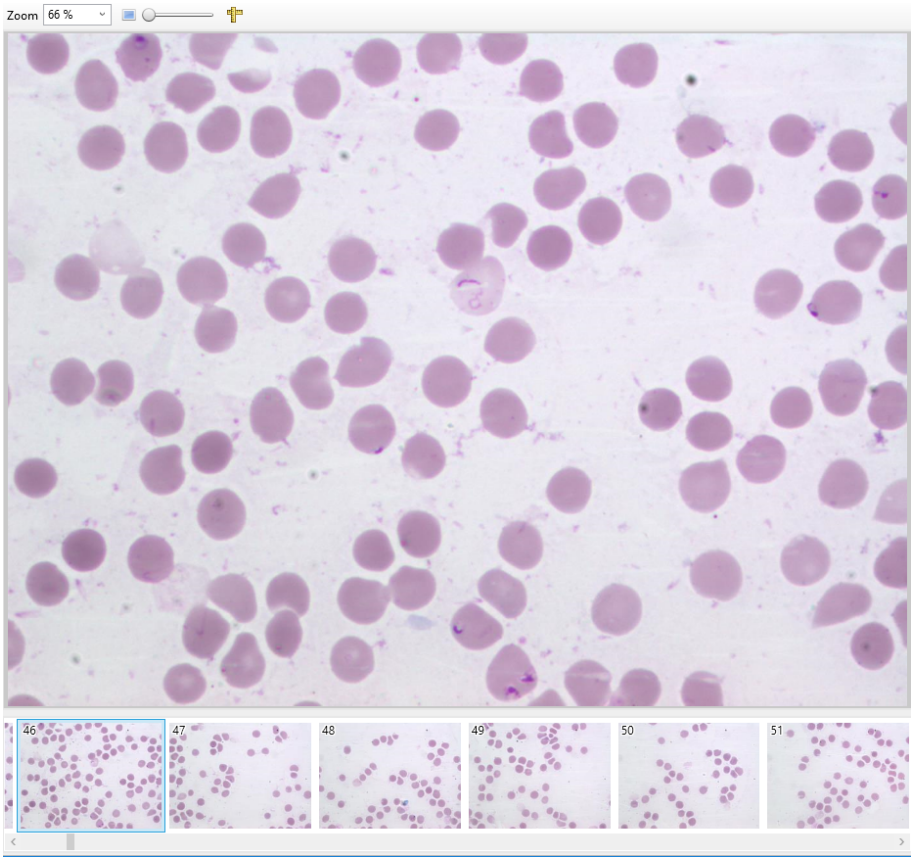


Fig. 69. Thin smear gallery

“Thin smear” mode displays frames captured in the thin part of the smear.

The gallery is divided into two panels: information about the saved frames and gallery of these frames.

5.5 Sample Comparison

Sample comparison is available for CBC samples, and also for BF, Cyto, CSS, Pap, Pap ICC, STDs, Histo with digital slides.

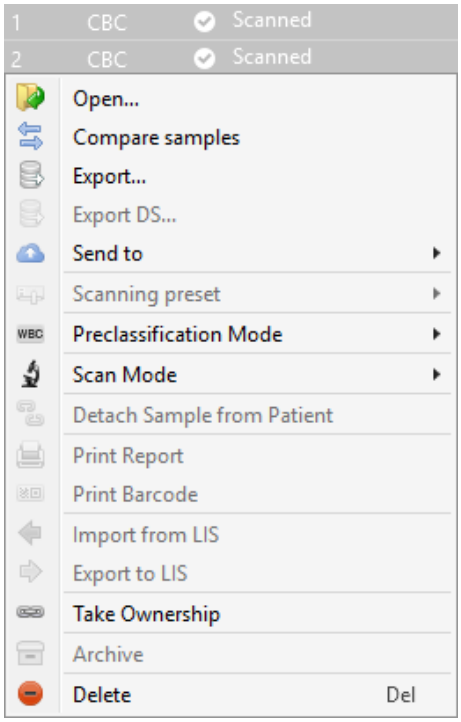


Fig. 70. Sample comparison

To compare samples, you need to select two samples and select the “Compare samples” option in the context menu.

5.5.1 Comparing CBC samples

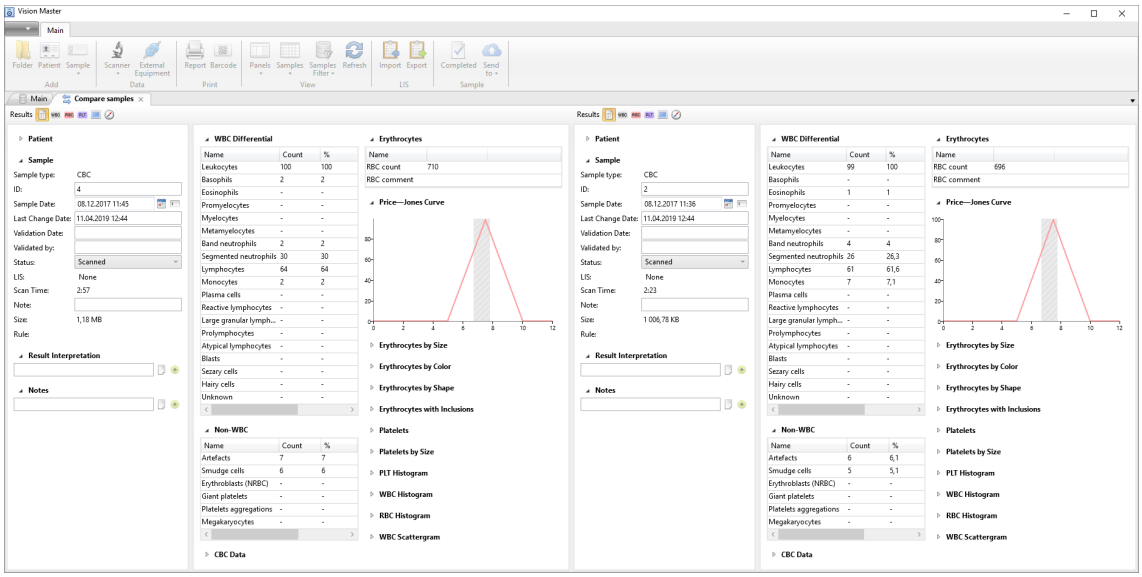


Fig. 71. CBC sample comparison. “Sample examination results” tab

Sample comparison is performed in a separate tab displaying examination results for two samples. The following tabs are available for comparison:

- — Sample examination results;
- WBC — Leukocytes;
- RBC — Erythrocytes;
- PLT — Platelets;

- — Full frames;
- — Navigator.

The contents and functionality of these tabs is the sample as with separate sample viewing, described in the section 5.4.7.3.

5.5.2 Comparing samples with digital slides

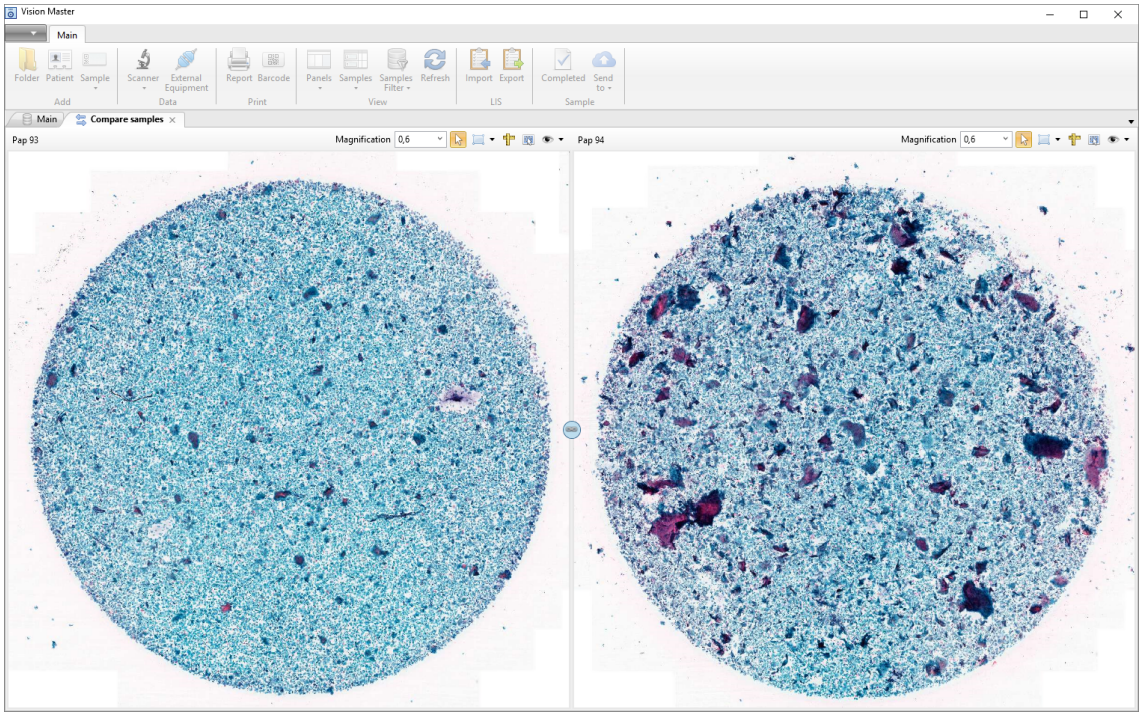


Fig. 72. Comparing samples with digital slides

Digital slides of the selected samples are displayed in a separate tab divided into two halves. Available tools:

- Zoom;
- Selector/Hand;
- Annotation (unavailable for samples with “Completed” status):
  - Rectangular area;
  - Ellipse;
  - Polygonal chain;
  - Polygon;
  - Line segment;
  - Pointer;
- Ruler;
- Save Image;
- “View” drop-down list:
  - Thumbnail;
  - Tracing;
  - Preview;
  - Scale;
  - Annotations;
  - Objects.

The “Link slides” tool synchronizes the viewing of digital slides. After being clicked, the button changes to .

5.6 Patient Editor

Attention!

To access the patient's personal data in the server DB, you need to enable the "GDPR Approved" parameter in the Vision Database Manager application.

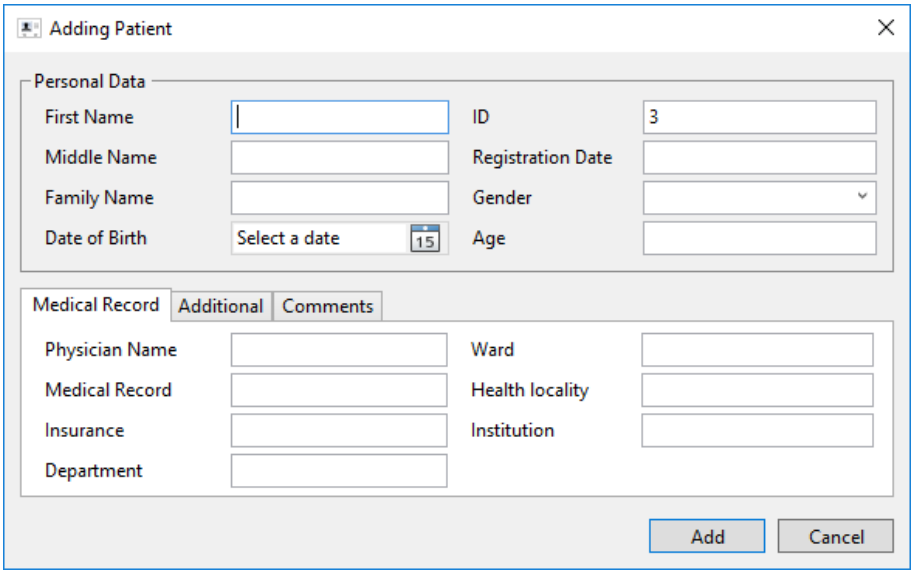


Fig. 73. Patient editor

A patient record contains the following text fields:

- First Name;
- Middle Name;
- Family Name;
- Date of birth;
- ID;
- Registration Date;
- Gender;
- Age.

"Medical Record" section:

- Physician Name;
- Medical Record;
- Insurance;
- Department;
- Ward;
- Health locality;
- Institution.

"Additional" section:

- City (set through the "Cities" reference, see the Section 5.12.2);
- Address;
- Phone;
- Email;
- Postcode.

"Comments" section:

- Commentary.

You can an indicate institute, a department, a practice and a ward for stationary patients.

Fill in all fields using the keyboard, toggling from field to field by left-clicking or pressing the Tab key.

Fields with dates can be filled in using a keyboard by entering dates in "DD.MM.YYYY" format (e.g. 03.05.1997) or by setting the date in the calendar. To do so, click on the calendar icon on the right side of the field and select the required date.

Gender is selected from the drop-down list. Patients for Pap, Pap ICC samples can only be female. Patients for CSS samples can only be male.

After all data are filled in, click “OK” or close the patient editor.

5.7 External Equipment and Data Reception

To receive data, it is necessary to properly adjust the device in the “Service” | “External Equipment” (for further details see the corresponding section of the manual).

The next step is to start the device by activating the “Blood Analyzer” button on the “Main” ribbon.

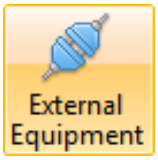


Fig. 74. Active data reception

The samples sent from the device will be automatically added to sample list.

5.8 Scanner

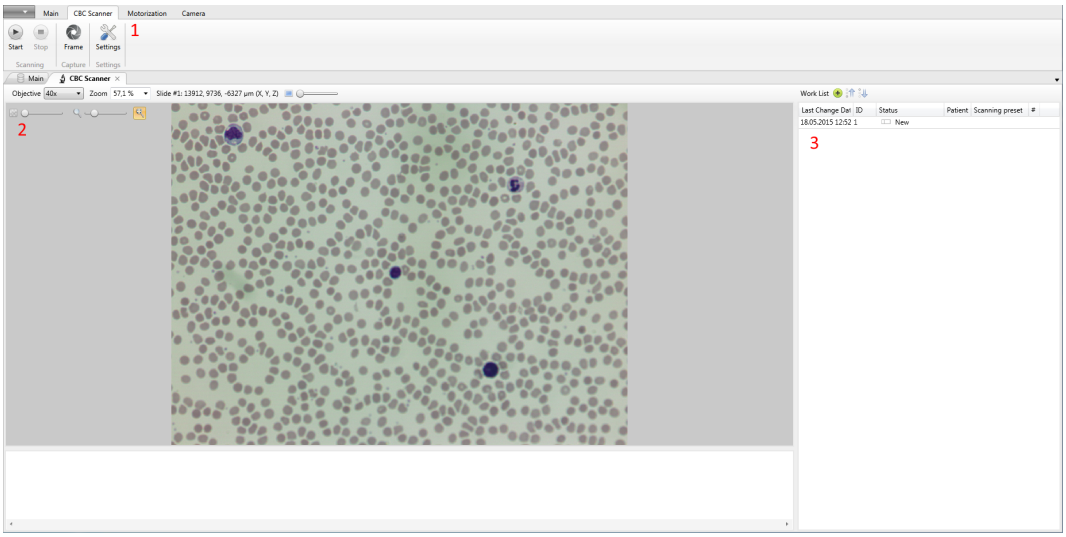


Fig. 75. Scanner

Attention!

After updating the previous Vision versions to Vision 1.16 you will have to reconfigure all motorization parameters.

Attention!

Simultaneous operation of sample scanner and change to sample pre-classification requires GeForce GTX x60 video card with at least 6 GB of video memory.

Click “Scanner” on the “Main” ribbon to open the “Scanner” ribbon. If the scanner is not connected, the “Optical System” service will be open to add an optical system.

The calibration procedure will start automatically once this tab is opened for the first time, provided that the scanner is properly adjusted.

The dialogue contains:

1. Ribbon managing elements;
2. Live camera video displaying window;
3. Work List.

The video managing tab is intended for displaying of live video.

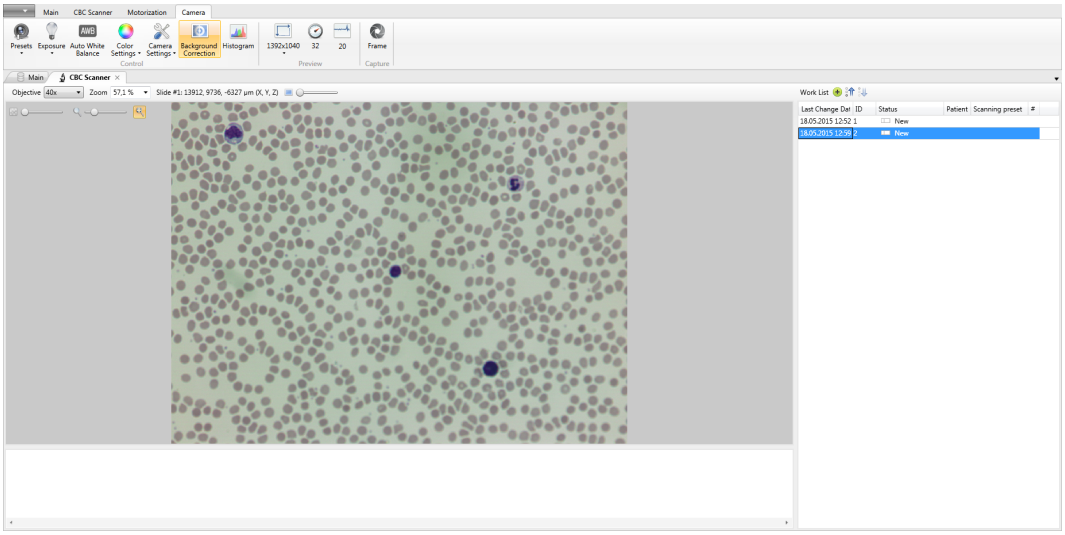


Fig. 76. Scanner with a connected camera

When motorization is successfully connected, live video appears in a working window where real time video image is being transferred.

The following control ribbons are available:

- “Scanner” — tools for scanner control;
- “Motorization” — tools for motorized stage managing and image focusing;
- “Camera” — tools for Vision digital camera managing.

Fig. 77. Work list elements

Work list control elements include the following components:

- Adding a sample into the scanning queue;
- Moving the sample up in the queue;
- Moving the sample down in the queue.

5.8.1 “Scanner” Control Ribbon

The ribbon contains tools for scanning management and settings.

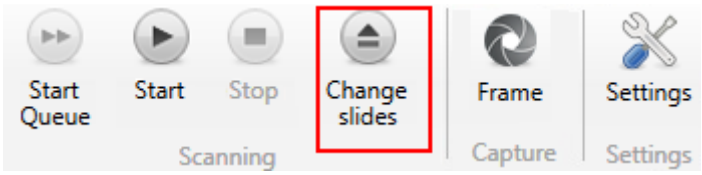


Fig. 78. Scanner control ribbon

The Scanner control ribbon contains the following controls:

- “Scanning” Section:
  - “Start/Next Slide” starts the scanning of the slides in the queue until all sample are completed, or until all slides are scanned. Once the scanning has started, the button changes to the “Next Slide” button that allows skipping the current slide and start scanning the next one.
  - “Start/Pause” starts sample scanning process, changes to the “Pause” button during scanning;
  - “Stop” stops sample scanning;
  - “Change slides” start preparation to changing slides;
- “Capture” section:

- “Frame” — capture the current image (only for CBC in automatic scanning mode and for Bone marrow in manual scanning mode);
- “Settings” section:
  - “Settings” — opens dialog window of additional scanning settings.

5.8.2 CBC Scanner[32]

The “CBC” samples scanner has its own settings.

Important!

Mismatch of blood samples and their markings may lead to confusion in the results and incorrect diagnoses for patients.

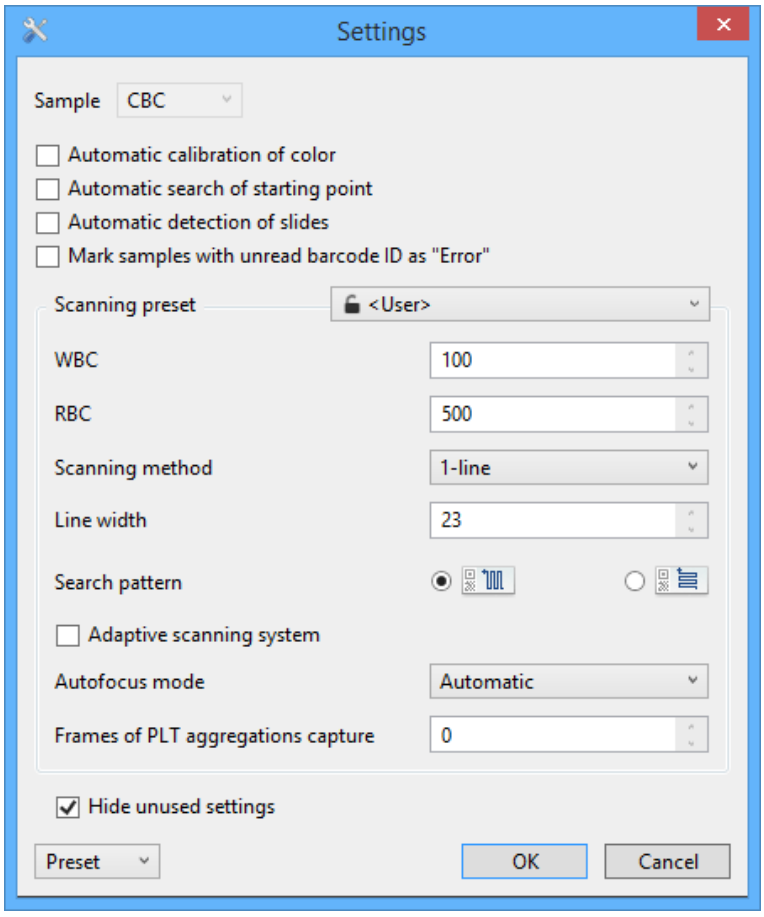


Fig. 79. “Settings” window

Settings contains following options:

- “Automatic calibration of color” — activate this option to run color calibration each time the first scanning begins; for an eight-slide microscope the automatic color calibration will run at the beginning of every queue;
- “Automatic search of starting point” — tick this option to activate automatic starting point search prior to scanning each slide;
- “Automatic detection of slides” — barcode detection;
- “Mark samples with unread barcode ID as “Error”” — appears only when connecting an internal barcode or label reader;
- “Scanning preset” — scanning preset selection.

[32] Depends on delivery package

Attention!
Scanning presets from previous versions are not supported.

- “WBC” — “WBC” counter sets the number of leukocytes required to be found when scanning. It is possible to set 1000 leukocytes as maximum;
- “RBC” — “RBC” counter sets the number of erythrocytes required to be found when scanning. The counter operates in the range from 200 to 10000 erythrocytes per scan (RBC =0 value is also available);
- “Scanning method” — selection of a scanning method from a drop-down list (1-line or 2-lines);

Attention!
The accuracy of building the Z plane on a small scanning area will be lower.

- “Line width” — necessary line width measured in fields of view (FOV);
- “Search pattern” — scanning trajectory selection;
- “Adaptive scanning system” — check the box to reduce the length of each next pass by one field if it has detected that there were no leukocytes in 3 previous frames. Uncheck the box to bring the scanning trajectory back to constant length;
- “Autofocus mode”:
    - “Automatic”;
    - “Z plane construction”;
- “Frames of PLT aggregations capture” sets amount of frames;
- “Hide unused settings”.

5.8.2.1 *Manual Scan Mode*

Manual scanning mode is available for CBC samples.

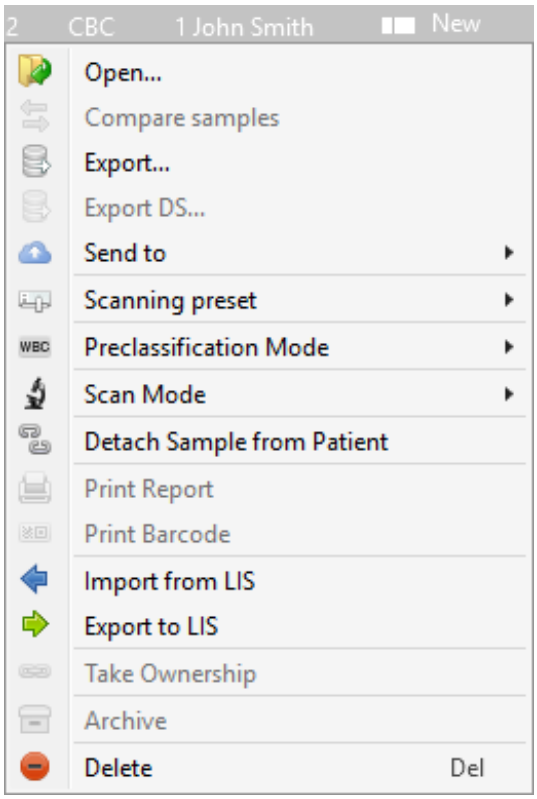


Fig. 80. Selection of a scanning mode for a sample

After selecting a new sample, right-click on it in the sample table and select “Scan Mode” — “Manual” in the menu.

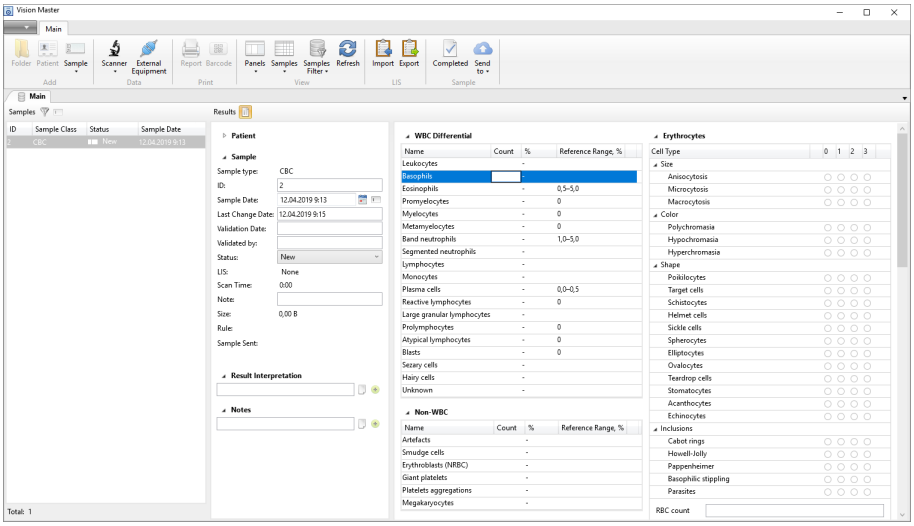


Fig. 81. Entering values in the sample data table

After that the sample data tables in the “Results” panel will be available for manual input. To input a value, double-click the selected field. Press “Enter” after inputting the value to move to the next line.

5.8.3 RET Scanner[33]

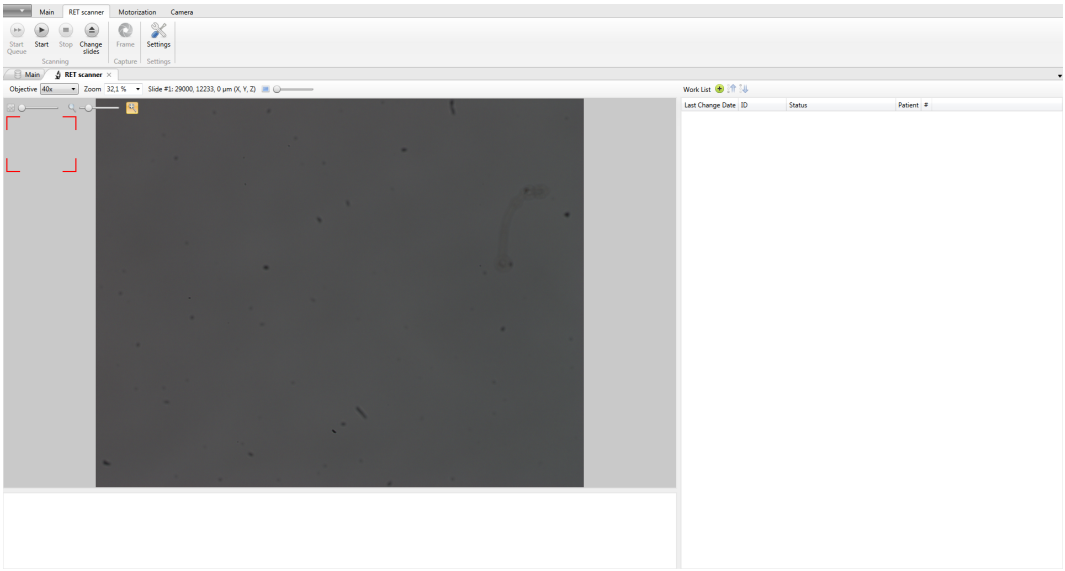


Fig. 82. “RET” scanner

The “RET” samples scanner has its own settings.

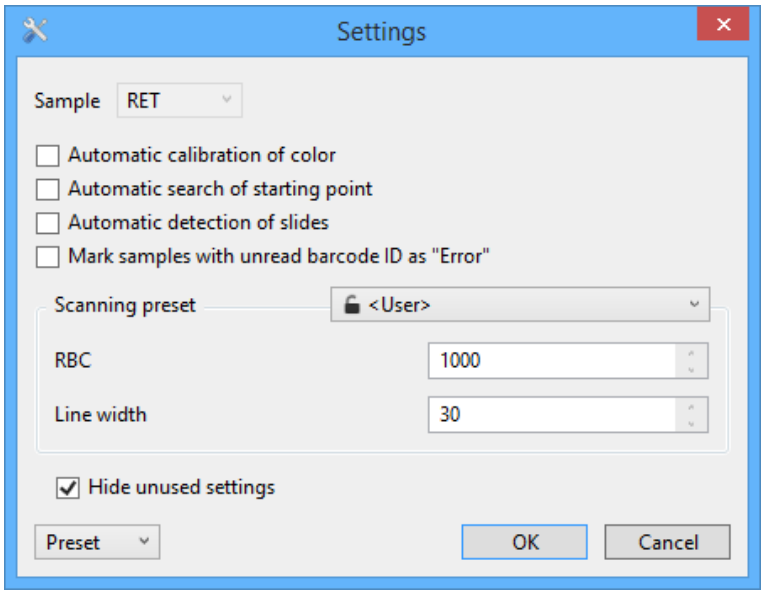


Fig. 83. “Settings” window for “RET” samples

The settings include the following options:

- “Automatic calibration of color” — when this option is activated the color calibration will be automatically performed once after opening the scanner ribbon in the beginning of the first scanning. For an eight-slide microscope the automatic color calibration is performed before scanning of each queue;
- “Automatic search of starting point” — when this option is activated the search of starting point will be performed automatically before scanning of each smear;
- “Automatic detection of slides” — detection of slides after the start of the scanner;
- “Mark samples with unread barcode ID as “Error”” — appears only when connecting an internal barcode or label reader;
- “Scanning preset” — scanning preset selection;

[33] Depends on delivery package

Attention!

Scanning presets from previous versions are not supported.

- “RBC” — setting the number of erythrocytes needed to be detected in the course of scanning to complete the analysis. You can set the number from 200 to 10000 RBCs for scanning (RBC=0 value is also acceptable);
- “Line width” — bypass line width value measured in fields of view;
- “Hide unused settings”.

5.8.4 Bone Marrow Scanner[34]

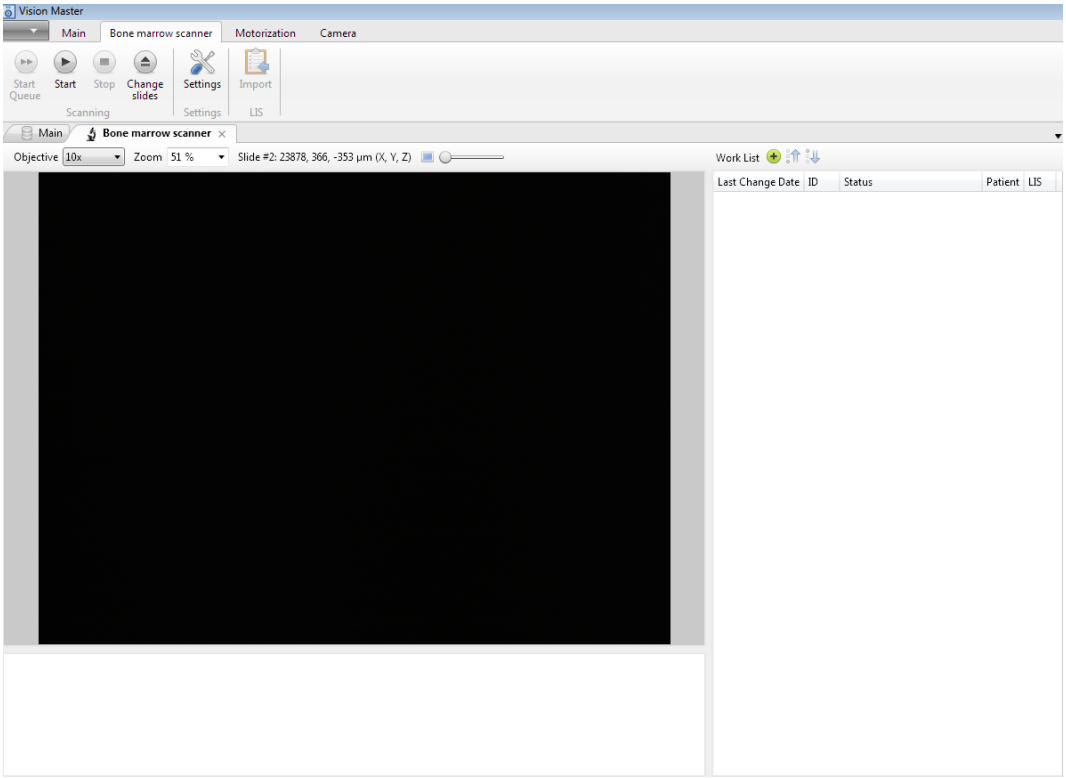


Fig. 84. “Bone marrow” scanner

The “Bone marrow” scanner has two operation stages.

At the first stage the scanner searches for regions of interest (ROI), megakaryocytes and abnormal cells. At the second stage the scanner collects formed elements in the regions of interest and frames with megakaryocytes and abnormal cells, if the corresponding settings are enabled.

The “Bone marrow” scanner has its own settings.

[34] Depends on delivery package

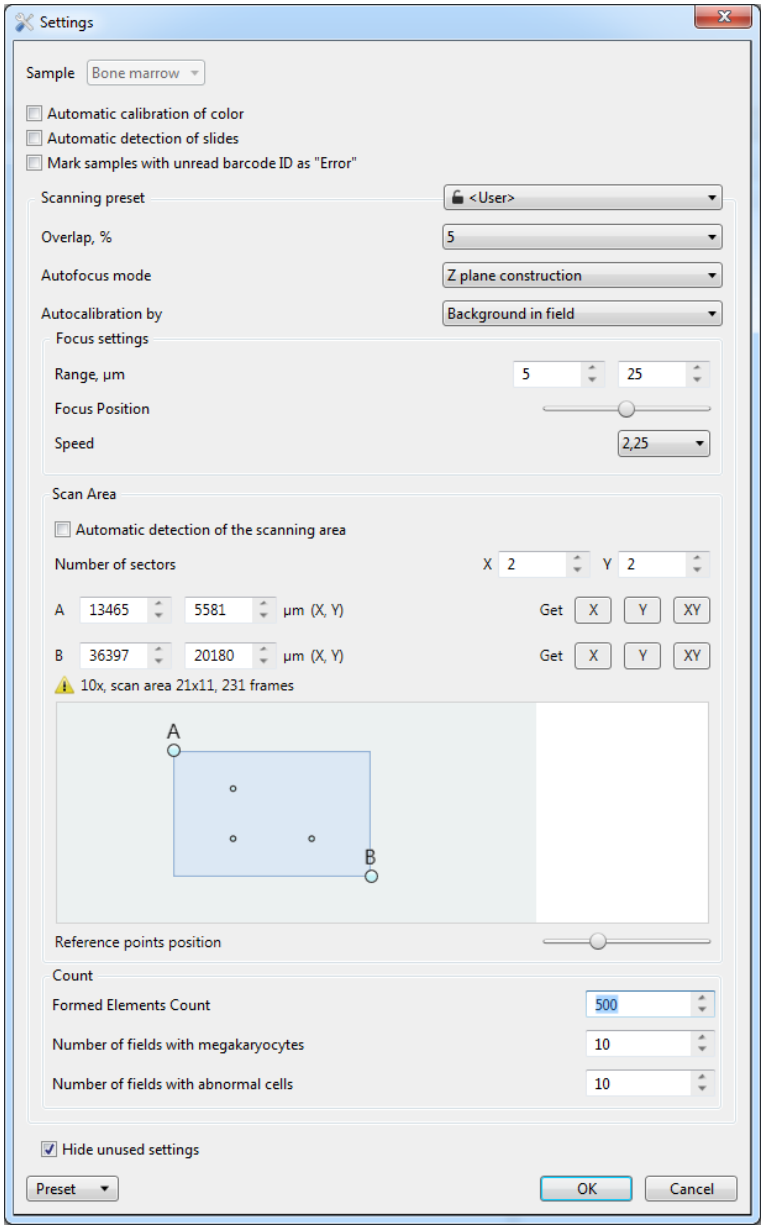


Fig. 85. Settings

- “Automatic calibration of color” — when this option is activated the color calibration will be automatically performed once after opening the analyzer ribbon in the beginning of the first scanning. The automatic color calibration is performed before scanning of each queue;
- “Automatic detection of slides” — detection of slides after the start of the scanner;
- “Mark samples with unread barcode ID as “Error”” — appears only when connecting an internal barcode or label reader;
- “Scanning preset” — scanning preset selection;

Attention!
Scanning presets from previous versions are not supported.

- “Overlap, %” — sets the percentage of frames overlap for doubling parts of the scanning areas;
- “Autofocus” mode:
  - “Automatic”;

    - “Each frame”;
    - “Z plane construction”;
- “Autocalibration by”:
    - “Background in field”;
    - “Average color in field”;
- “Focus settings”:
    - Range, µm;
    - Focus position;
    - Speed;
- “Scan area” — setting the scanning area coordinates on the smear and coordinates of the starting and finishing points. The scanning area should be set to start scanning;
    - “Automatic detection pf the scanning area” — on/off;
    - “Number of sectors” — number of sectors required to build a plane;
        - A — starting point coordinates;
        - B — finishing point coordinates.
        - “Get” — this option reads the current coordinates (X, Y, XY) from the motorized stage;

Set the position of the point A and click the “X” or “Y” button to save the coordinates separately, “XY” to save X and Y coordinates at the same time.

Repeat for the point B.

    - “Reference points position” — position adjustment of the three reference points used for construction of the scanning plane. Use when scanning round shaped specimens.
- “Count”:
    - “Formed Elements Count” — number of elements needed to complete the scanning;
    - “Number of fields with megakaryocytes”;
    - “Number of fields with abnormal cells”;
- “Hide unused settings”.

5.8.5 BF[35], Cytology[35], CSS[35], Pap[35], Pap ICC[35], Histo[35] Scanner

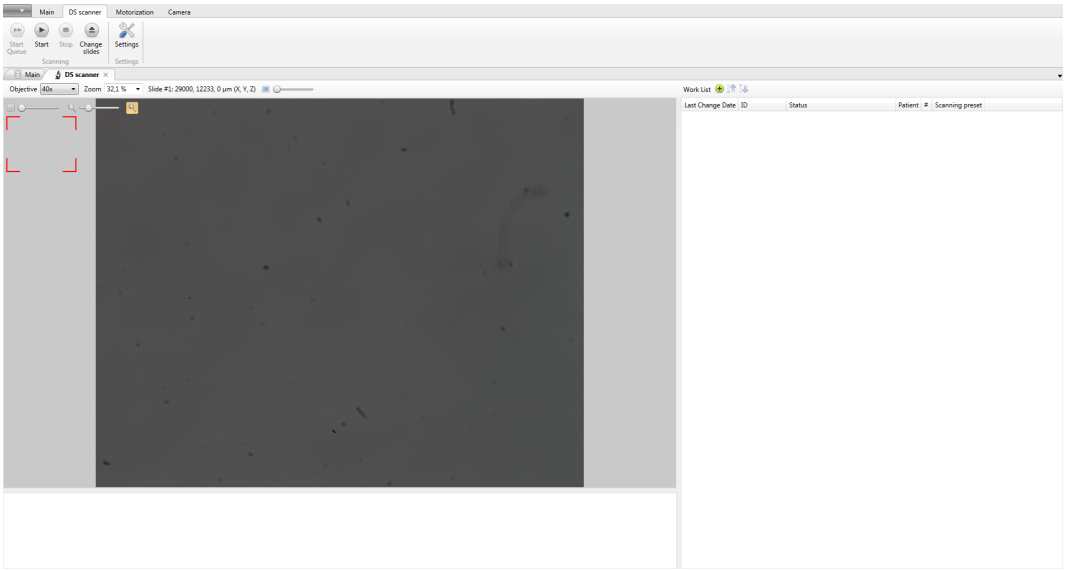


Fig. 86. Sample scanner

The “BF”, “Cytology”, “CSS”, “Pap”, “Pap ICC”, “Histo” sample scanners have their own settings.

[35] Depends on delivery package

The “BF” scanner is used to scan CSF and exudates samples.

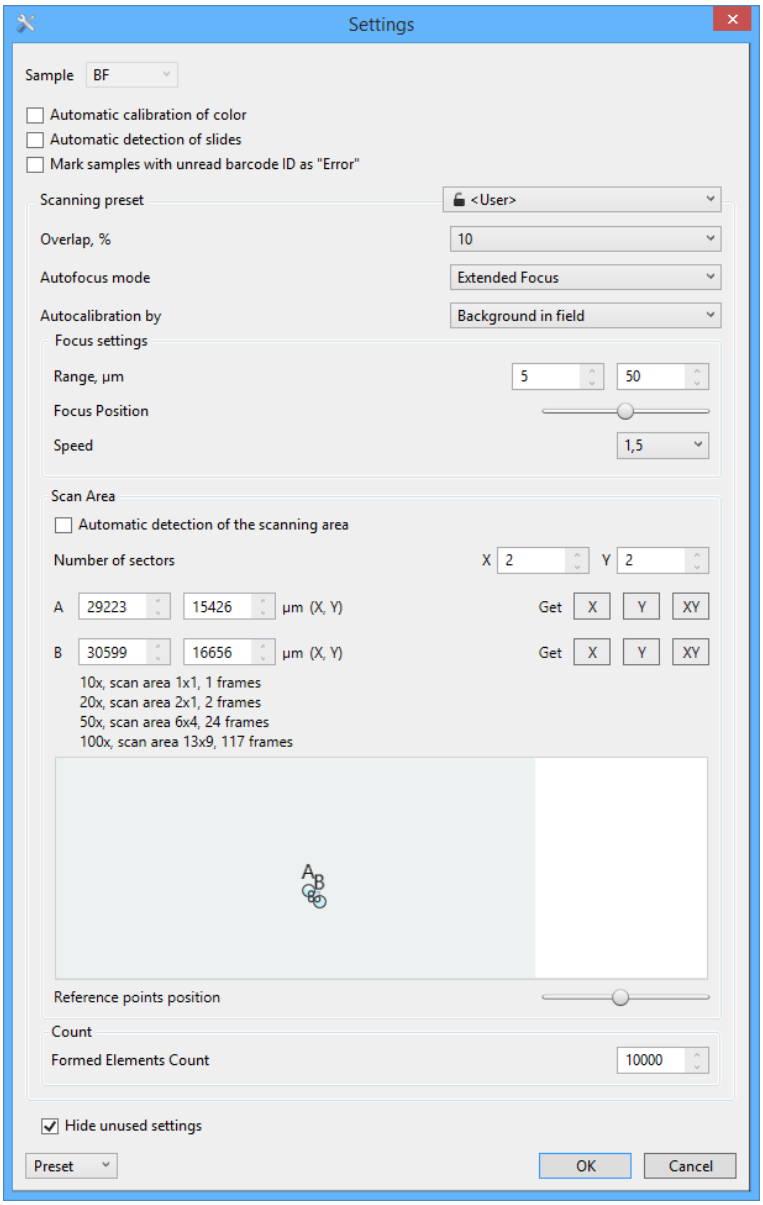


Fig. 87. “Settings” window for “BF”, “Cytology”, “CSS”, “Pap”, “Pap ICC”, “Histo” scanners

The settings include the following options:

- “Automatic calibration of color” — when this option is activated the color calibration will be automatically performed once after opening the scanner ribbon in the beginning of the first scanning. The automatic color calibration is performed before scanning of each queue;
- “Automatic slide detection” — automatic detection of slides when activating the scanner;
- “Mark samples with unread barcode ID as “Error”” — appears only when connecting an internal barcode or label reader;
- “Scanning preset” — scanning preset selection;

Attention!

Scanning presets from previous versions are not supported.

- “Overlap, %” — sets the percentage of frames overlap for doubling parts of the scanning areas;
- “Autofocus” mode:
    - “Automatic”;
    - “Each frame”;
    - “Z plane construction”;
    - “Extended focus”;
- “Autocalibration by”:
    - “Background in field”;
    - “Average color in field”;
- “Focus settings”:
    - Range, μm;
    - Focus position;
    - Speed;
- “Scanning area” — setting the scanning area coordinates on the smear and coordinates of the starting and finishing points;
    - “Automatic detection of scanning area” — detection of the smear position within the specified scanning area;
    - “Number of sectors” — number of sectors required to build a plane;
        - A — starting point coordinates;
        - B — finishing point coordinates.
        - "Get” — this option reads the current coordinates (X, Y, XY) from the motorized stage;

Set the position of the point A and click the “X” or “Y” button to save the coordinates separately, “XY” to save X and Y coordinates at the same time.

Repeat for the point B.

    - “Reference points position” — position adjustment of the three reference points used for construction scanning plane.
- “Scan until elements captured” — number of elements needed to complete the scanning, only for Pap scanner;
- “Formed Elements Count” — number of elements needed to capture by scanner, only for BF scanner;
- “Hide unused settings”.

5.8.6 STDs Scanner[36]

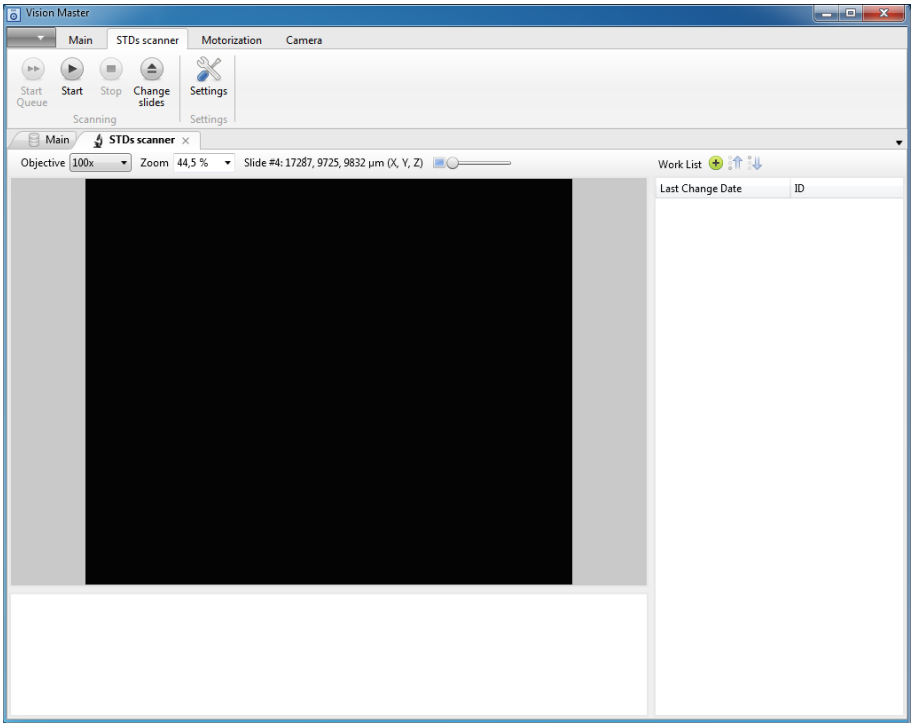


Fig. 88. “STDs” sample scanner

“STDs” sample scanner has its own settings.

[36] Depends on delivery package

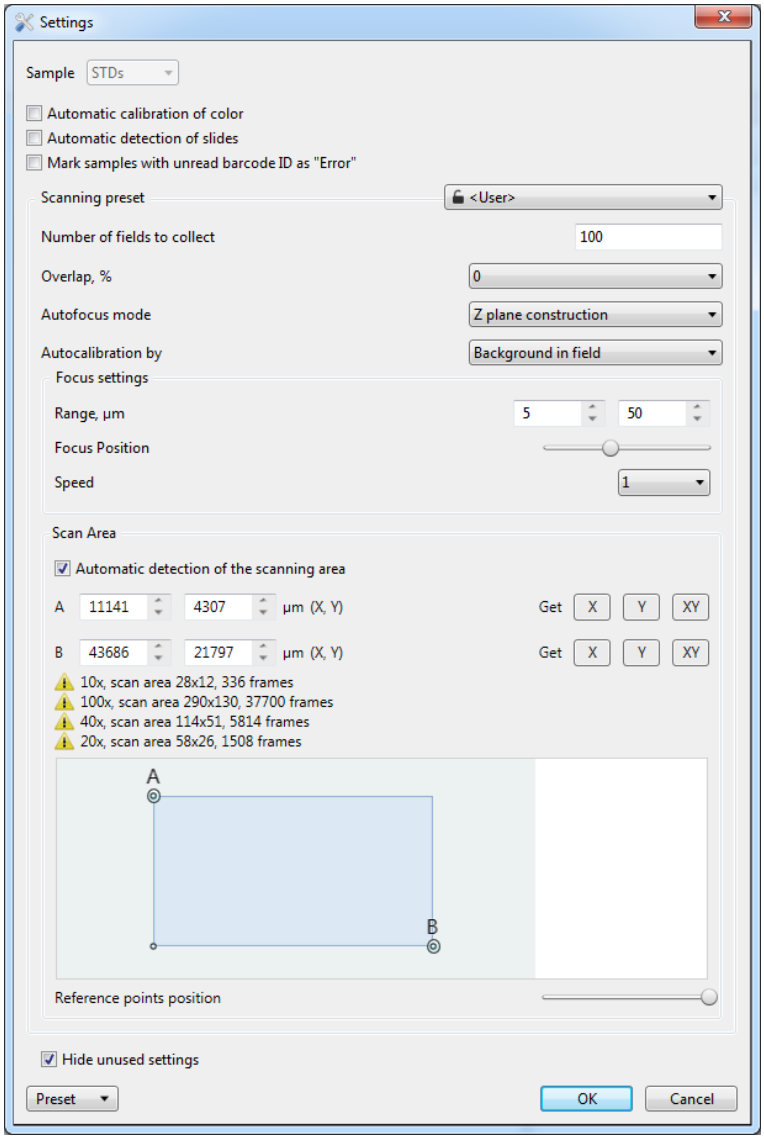


Fig. 89. “STDs” scanner settings

The settings include the following options:

- “Automatic calibration of color” — when this option is activated the color calibration will be automatically performed once after opening the scanner ribbon in the beginning of the first scanning. The automatic color calibration is performed before scanning of each queue;
- “Automatic slide detection” — automatic detection of slides when activating the scanner;
- “Mark samples with unread barcode ID as “Error”” — appears only when connecting an internal barcode or label reader;
- “Scanning preset” — scanning preset selection;
- “Number of fields to collect”;
- “Overlap, %” — sets the percentage of frames overlap for doubling parts of the scanning areas;
- “Autofocus mode”:
    - “Automatic”;
    - “Each frame”;
    - “Z plane construction”;
    - “Extended focus”;
- “Autocalibration by”:

    - “Background in field”;
    - “Average color in field”;
- Focus settings”:
    - Range, µm;
    - Focus position;
    - Speed;
- “Scan area” — setting the scanning area coordinates on the smear and coordinates of the starting and finishing points.
    - “Automatic detection of the scanning area” — identification of the smear position within the set scanning area.
        - A — starting point coordinates;
        - B — finishing point coordinates;
        - “Get” — this option reads the current coordinates (X, Y, XY) from the motorized stage;

Set the position of the point A and click the “X” or “Y” button to save the coordinates separately, “XY” to save X and Y coordinates at the same time.

Repeat for the point B.

- “Reference points position” — position adjustment of the three reference points used for construction scanning plane.
- “Hide unused settings”.

5.8.7 Hemoparasites Scanner[37]

The “Hemoparasites” scanner has two operation stages.

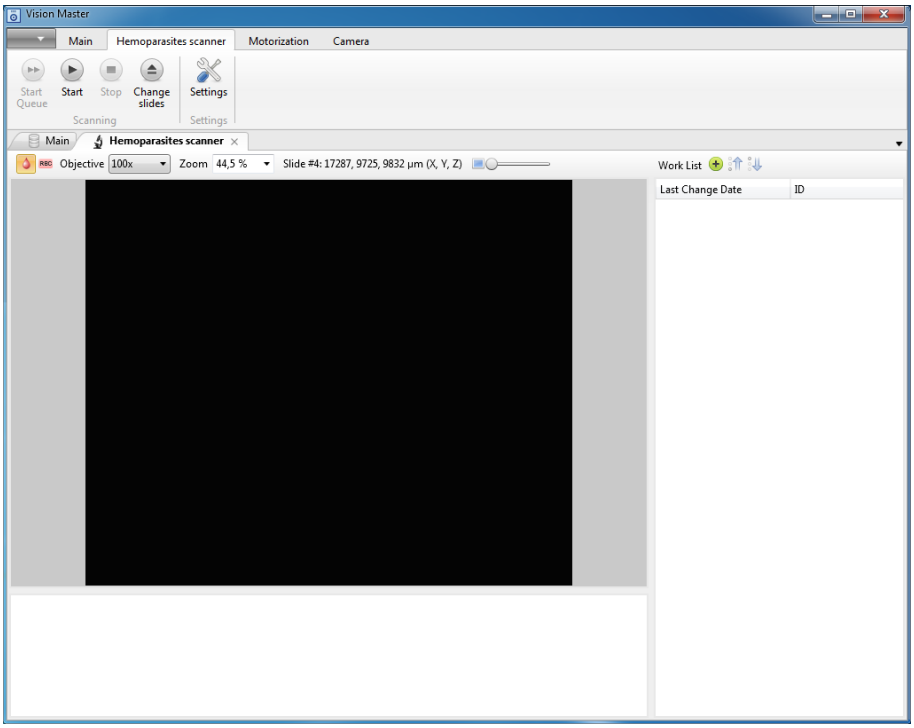


Fig. 90. “Hemoparasites” scanner

— The first stage involves scanning of the thick smear. After that, a selection of fields is created.

RBC — The second stage involves scanning of the thin smear and a search for erythrocytes. Only the samples with plasmodium identified during the first stage are included in the work list for the second stage. You need to check the corresponding box in the sample-viewing mode.

The “Hemoparasites” samples scanner has its own settings.

[37] Depends on delivery package

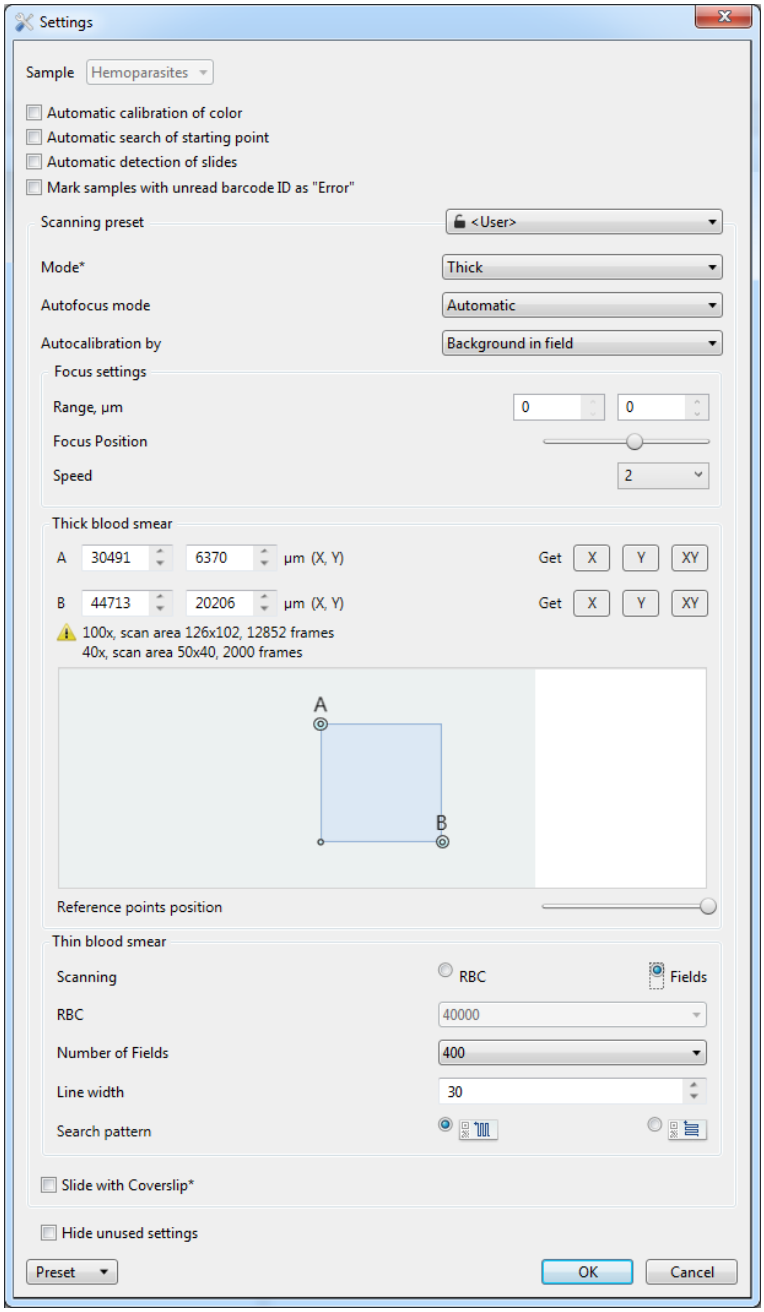


Fig. 91. Settings

- “Automatic calibration of color” — when this option is activated the color calibration will be automatically performed once after opening the analyzer ribbon in the beginning of the first scanning. The automatic color calibration is performed before scanning of each queue;
- “Automatic search of starting point” — when this option is activated the search of starting point will be performed automatically before scanning of each smear;
- “Automatic detection of slides” — detection of slides after the start of the scanner;
- “Mark samples with unread barcode ID as “Error”” — appears only when connecting an internal barcode or label reader;
- “Scanning preset” — scanning preset selection;

Attention!

Scanning presets from previous versions are not supported.

- “Mode”:
  - “Thick”;
  - “Thin”;
- “Autofocus” mode:
  - “Automatic”;
  - “Each frame”;
  - “Z plane construction”;
- “Autocalibration by”:
  - “Background in field”;
  - “Average color in field”;
- “Focus settings”:
  - Range, µm;
  - Focus position;
  - Speed;
- Thick blood smear:
  - A — starting point coordinates;
  - B — finishing point coordinates;
  - Get” — this option reads the current coordinates (X, Y, XY) from the motorized stage;

Set the position of the point A and click the “X” or “Y” button to save the coordinates separately, “XY” to save X and Y coordinates at the same time. Repeat for the point B.

  - “Reference points position” — position adjustment of the three reference points used for construction of the scanning plane.
- Thin blood smear:
  - “Scanning” — selection of one of two scanning modes:
    - “RBC” — scanning continues until the specified number of erythrocytes is found;
    - “Fields” — scanning continues until the scanner finds the specified number of scanning fields on which erythrocytes will be searched for;
  - “RBC” — required number of RBC for scanning;
  - “Number of fields” — required number of fields for scanning;
  - “Line width” — bypass line width value measured in fields of view;
  - “Search pattern” — scanning pattern selection.

Set the position of the point A and click “Get” to save the coordinates. Repeat for the point B.

- “Hide unused settings”.

5.8.8 “Motorization” Control Ribbon

The “Motorization” control ribbon contains motorized stage settings options.

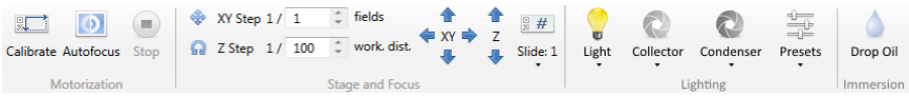


Fig. 92. “Motorization” control ribbon with tools

“Motorization” control ribbon contains the following controls:

- “Motorization” section:
  - “Calibrate” — slide calibration for delimitation and positioning of relative coordinates;
  - “Autofocus” — automatic adjustment of image sharpness;
  - “Stop” stops autofocusing or calibration.
- “Stage and Focus” section:

- “XY Step” sets the camera approach increment along the “X” and “Y” axes;
- “Z Step” sets the camera approach increment along the “Z” axis;
- “XY” allows moving an image with a set step along the X and Y axes;
- “Z” allows moving an image with a set step along the “Z” axis.
- “Slide: №” — drop-down list of the current slide number;

- “Immersion” section: (only for VP + Oil Dispenser):
  - “Drop Oil” — drop oil on the slide.

5.8.9 “Camera” Control Ribbon

Digital camera management tools, output and capture of the microscopic image

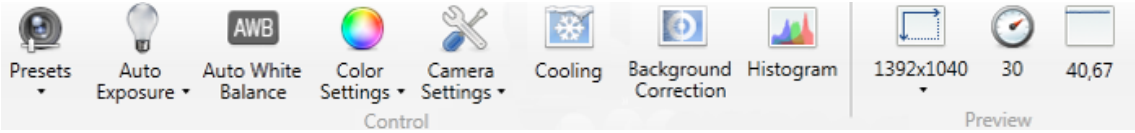


Fig. 93. “Camera” tool ribbon

The “Camera” ribbon contains the following controls:

- “Control” section:
  - “Presets” — drop-down list (save, load, delete, default) with camera presets.
  - “Exposure/Brightness” — slider of exposure/brightness settings (depends on auto exposure on/off);
  - “Auto white balance” — auto white balance on;
  - “Color Settings” — drop-down list with color settings, allows adjusting white balance, color correction, color depth and pixel depth;
  - “Camera Settings” — drop-down list with camera settings and image manipulation options;
  - “Cooling” — sensor cooling activation (only available with CAM2400);
  - “Background correction” — background correction mode on/off;
  - “Histogram” — histogram display on/off;
- “Preview” section
  - “Resolution” — list of possible definitions of the video stream;
  - “FPS” — frames per second;
  - “Sharpness” — the information about image sharpness.
- “Capture settings” — drop-down list with resolution settings. Only available for Vision Cam V2500 camera.

Attention!

To avoid interference when receiving an image, follow these steps:

- **Connect the camera to a separate USB controller on the computer motherboard.**
- **Use a high-quality USB cable.**
- **Connect an external power supply unit if available.**
- **Make sure the camera is installed correctly — misalignment will negatively affect the analysis results.**

5.9 Sample Scanning Error

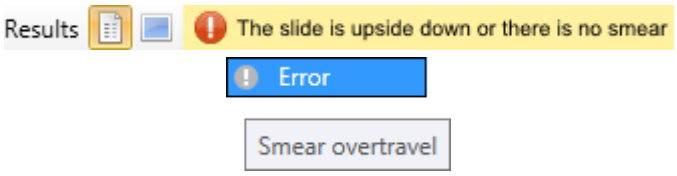


Fig. 94. Error information

If an error occurs while the operation is in process, the scanning is interrupted and the sample receives an “Error” status. To see detailed information, hover the mouse cursor over the sample or select it in the main menu and open the “Results” panel. Click “Completed” to finish the work with the sample.

5.9.1 CBC

Error	Kit type
	VP
The slide is upside down or there is no smear	✓
Incomplete WBC differential, large quantity of artefacts	✓
The slide is skipped	✓
Empty scanning area	✓
Sample scanning limit is exceeded	✓
Scanning area overtravel	✓
Smear overtravel	✓
Failure in sample scanning	✓
ID reading error	VP with a barcode scanner

5.9.2 RET

Error	Kit type
	VP
The slide is upside down or there is no smear	✓
Poor smear staining	✓
The slide is skipped	✓
Empty scanning area	✓
Wrong objective is selected	✓
Sample scanning limit is exceeded	✓
Scanning area overtravel	✓
Smear overtravel	✓
Failure in sample scanning	✓
ID reading error	VP with a barcode

	scanner

5.9.3 Bone marrow

Error	Kit type
	VP
The slide is upside-down or there is no smear	✓
The sample is omitted	✓
Empty scanning area	✓
Wrong objective is selected	✓
Sample scanning limit is exceeded	✓
Failure in sample scanning	✓
ROI is absent	✓
ID reading error	VP with a barcode scanner

5.9.4 BF, Cytology, CSS, Pap, Pap ICC, Histo

Error	Kit type
	VP
The slide is upside down or there is no smear	✓
The slide is skipped	✓
Failure in sample scanning	✓
ID reading error	VP with a barcode scanner

5.9.5 STDs

Error	Kit type
	VP
The slide is upside down or there is no smear	✓
The slide is skipped	✓
Failure in sample scanning	✓
ID reading error	VP with a barcode scanner

5.9.6 Hemoparasites

5.9.6.1 *Thick blood smear (DS)*

Error	Kit type
	VP

The slide is upside down or there is no smear	✓
The slide is skipped	✓
Failure in sample scanning	✓
ID reading error	VP with a barcode scanner

5.9.6.2 *Thin blood smear*

Error	Kit type
	VP
The slide is upside down or there is no smear	✓
Poor smear staining	✓
The slide is skipped	✓
Empty scanning area	✓
Sample scanning limit is exceeded	✓
Scanning area overtravel	✓
Failure in sample scanning	✓
ID reading error	VP with a barcode scanner

5.10 LIS communication

To start working with the LIS, you first need to configure the LIS communication in the “Service” | “LIS communication settings” section. For more details, read the section 5.14.4.

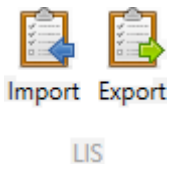


Fig. 95. Buttons for the LIS communication control

After the activation of the LIS communication, additional functions appear on the “Main” control ribbon, e.g. the “Export” button. When bidirectional communication is enabled, the “Import” button will also appear on the ribbon.

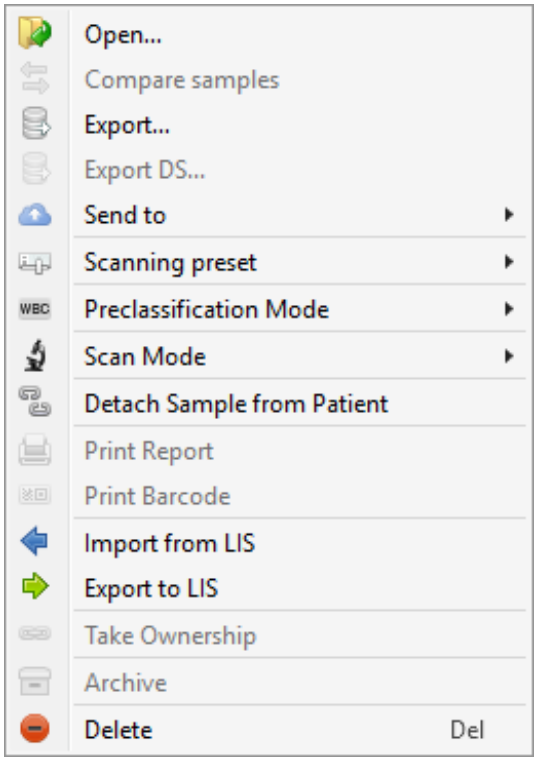


Fig. 96. Sample context menu with the active LIS communication

The same functions will also be added to the context menu of the samples.

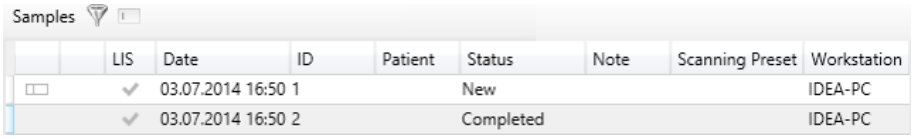


Fig. 97. Work with samples with the active LIS communication

In the samples table a new “LIS” field will appear containing the status of the LIS communication. This field may contain the following statuses:

- “Sending result” — data is being sent to the LIS system. Sending of the results starts automatically after changing the sample status to “Complete”, if this function is checked in the settings, or manually with the “Export” button;
- “Result sent” — result is successfully sent;
- “Waiting order” — Vision sent a request to update sample attributes data (Sample Date, Patients, etc.). To send a request manually you need to click the button “Import” or automatically with receiving sample through barcode or scanner;
- “Linked” — this sample has been updated according to the LIS data;
- “Waiting order and sending result” — result sending and expecting an order processing at the same time;
- “None” — sample has been added to a patient in the Vision and not yet exported to the LIS.

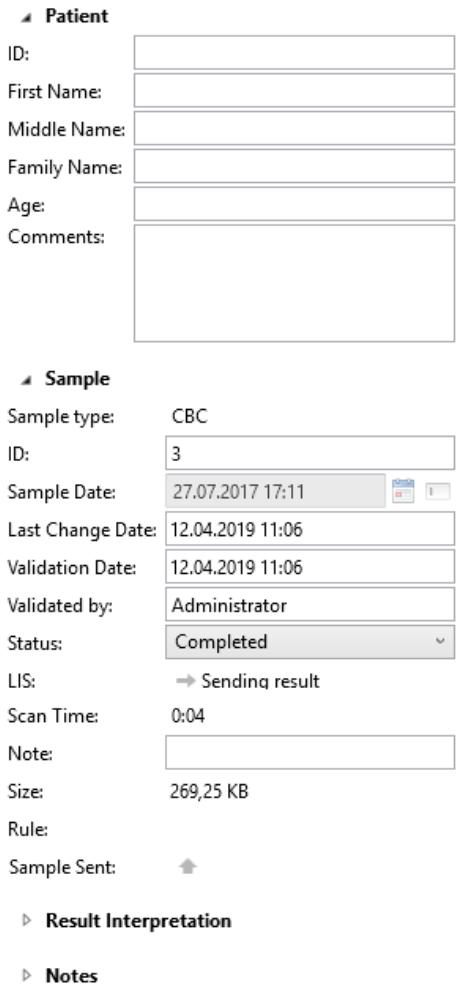


Fig. 98. Sample attributes with the active LIS communication

The status of the LIS communication is also displayed in the sample attributes.

5.11 Database

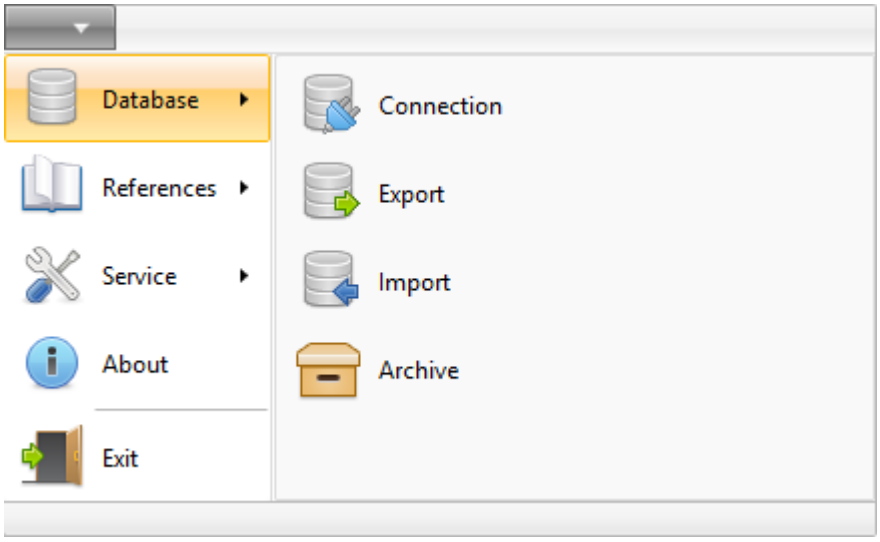


Fig. 99. Main menu, “Database” section

The “Database” section consists of the following items:

- “Connection” allows changing connection to the database, which is used in the program. By default, work is conducted with the Local Database, which is stored on

your computer. It is possible to change the connection and to use the MS SQL Server 2014 database which can be used with different Vision programs, and also from different workplaces;

- “Export” allows exporting data from the program database to program copies installed on other computers and to any other programs of medical data processing.
  Data are exported in “.visiondb” format containing standardized “.xml” format files.
  The files created by the Vision program contain all the records and samples from the program database;

Attention!

Export of patients must be disabled before exporting the DB, if you plan to hand over the data to other persons, e.g. a developer.

- “Import” allows importing data from other computers, and also from other programs of medical data processing, saved in “.visiondb” format containing standardized “.xml” format files.
  Choose behavior in case of conflict before import:
  - “Skip Existed”;
  - “Replace Existed”;
  - “Create New”.
- “Archive” — switch to the web application for work with archives. Available for databases with a set “Archive URL” and an active “Archive Enabled” checkbox.

Attention!

In the SQL Server, after importing the users, a new password should be set for them to login using the "Database Manager" application.

To create and configure the connection to a database on the SQL server, you need to run the Vision application with local administrator rights.

Attention!

If you have any problems with DB access, please contact your IT administrator.

Attention!

We recommend using MS SQL Server 2014 Standard or better for an increased sample storage capacity.

5.11.1 Connection

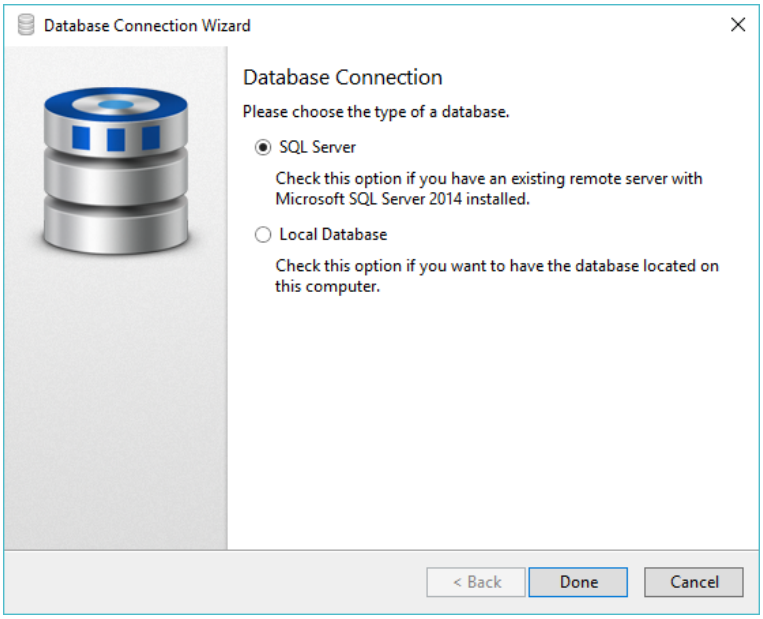


Fig. 100. Selection of SQL server database

If the connection to the database on the SQL server has been previously set by the administrator, select the “SQL Server” option and click “Done”. To edit connection settings, run the Vision application as an administrator. Setup instructions can be found in the “SQL Server” section of the manual.

If you selected “Local Database”, click “Next” and skip to the corresponding section of the manual

5.11.1.1 *SQL Server*

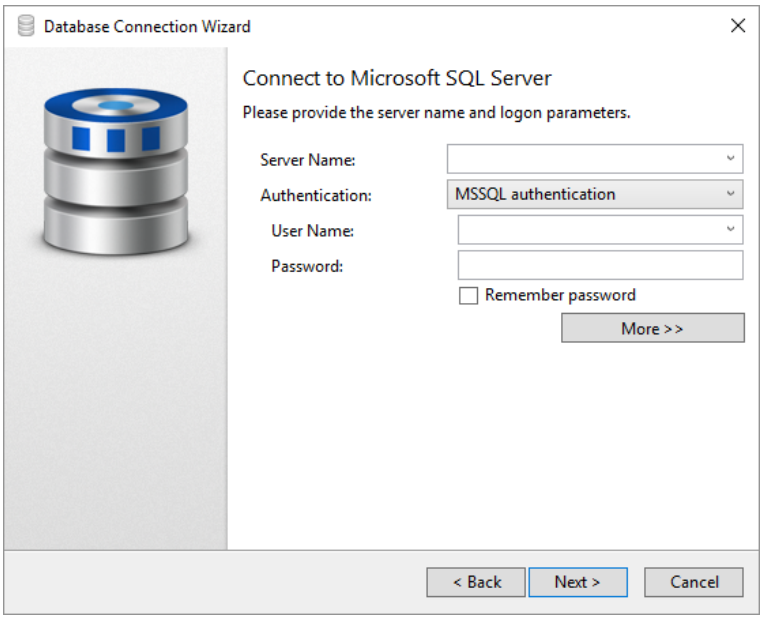


Fig. 101. Connecting to a Microsoft SQL Server

Specify the server name by clicking the ▾ button to the right of the “Server Name” line and selecting <Browse…>. The program will show the list of all available servers.

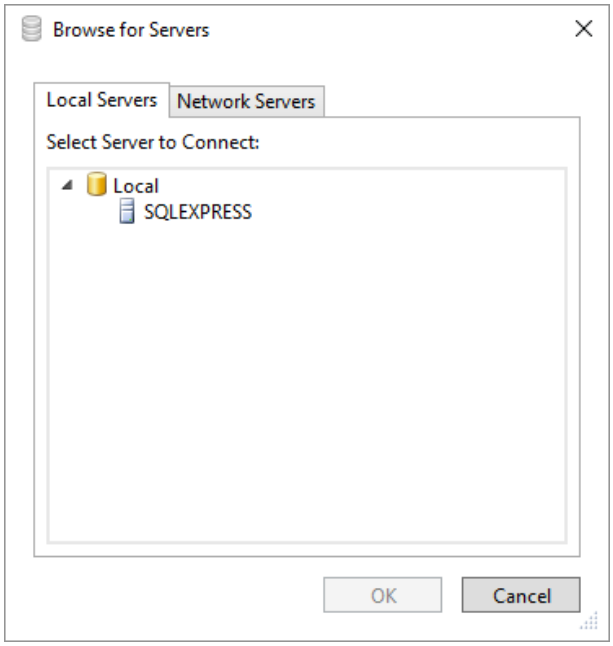


Fig. 102. List of available servers

If the Microsoft SQL Server is already set up on your computer, you can see it in the list. If the necessary server is not located on your computer, select the “Network Servers” tab.

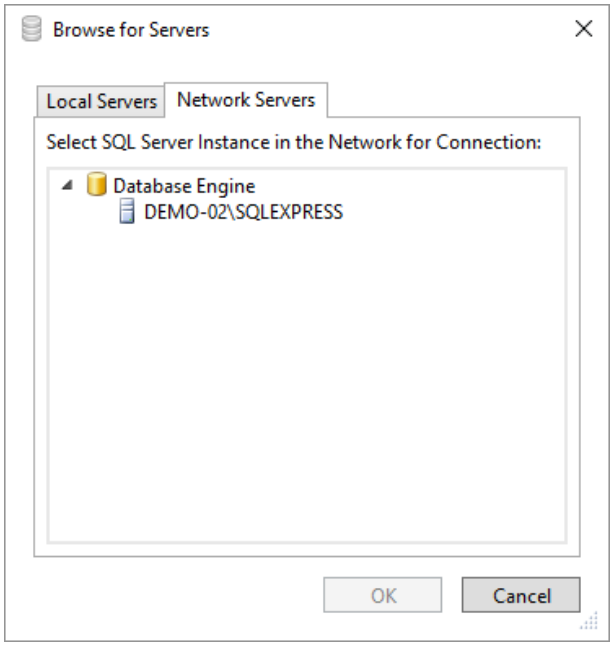


Fig. 103. List of available servers in the network

The “Network Servers” tab displays the list of all available servers in a network.
After selecting the necessary server click “OK” to pass on to the next step.

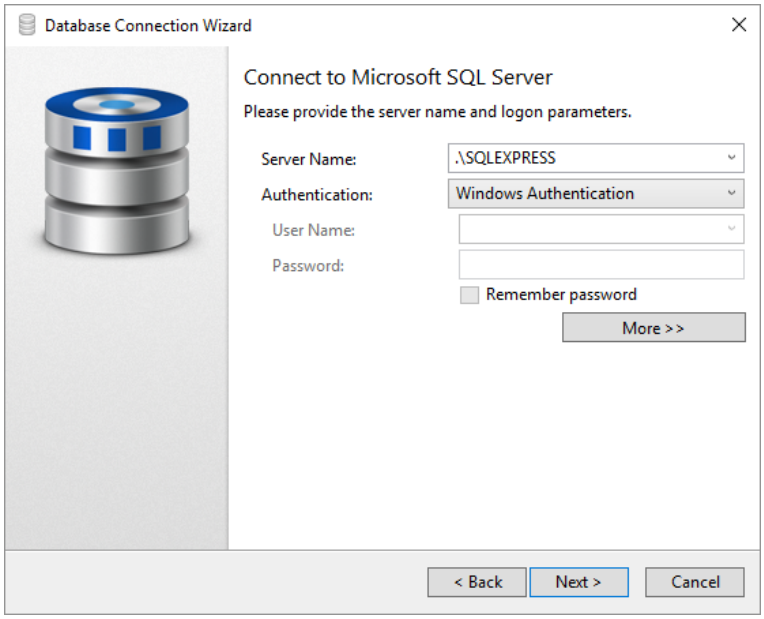


Fig. 104. Database Connection Wizard

Check the required server name. If a username and a password are required, enter them.

The next step is the selection of the authentication option. The application will offer you several options:

- "MS SQL Authentication" — selecting this option will require that you enter the username and the password that will correspond to your MS SQL server account. If you don't have these data, contact the IT administrator.
- "Windows Authentication" — selecting this authentication option will not require a username or a password; the application will automatically use the data of your computer account.

After filling in all the required fields, click "Next".

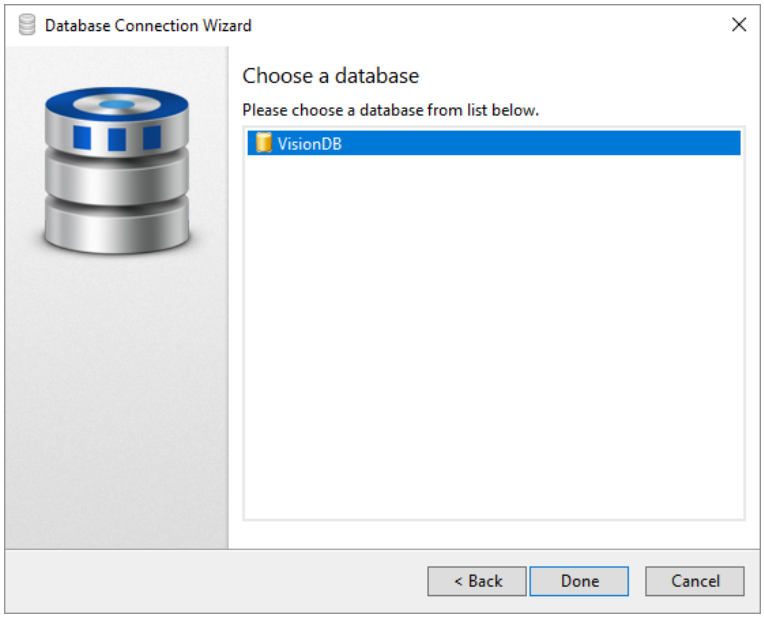


Fig. 105. Database selection

This window shows the list of all available databases you can connect to. Select the one you need, or click "Create new…" if you want to create a database. Click "Done".

The program will restart automatically and the new connection settings will be active once the program is launched.

Attention!

When using a network-attached storage, it is recommended to take measures of data backup (of the stored database).

Attention!

When using a network-attached storage, it is recommended to create a special user (DB administrator) with the rights to create and modify databases, and a regular DB user to work with databases with the rights to modify data.

5.11.1.2 *Local Database*

If you need to connect to a local database which is stored on your computer, follow further steps of the instruction:

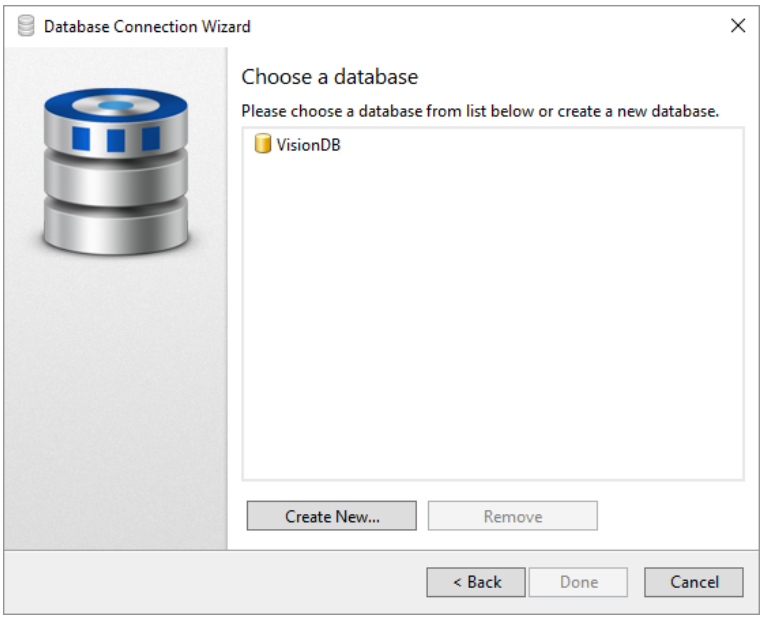


Fig. 106. Connecting to a local database

Select the required database from list. Create a new database by clicking the “Create New…” button. Click “Done”.

The program will restart and the new connection settings will be active.

5.12 References

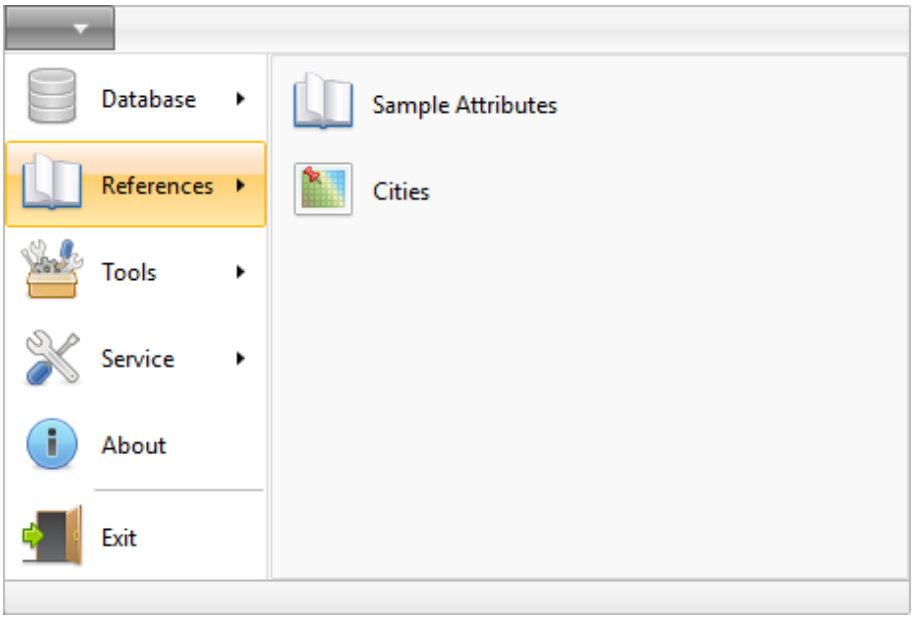


Fig. 107. Main menu, “References” section

The references contain the information the application refers to.

The Vision application contains the following references:

- “Sample Attributes” — reference of samples, attributes, sections and settings;
- “Cities” — reference of cities.

5.12.1 Sample Attributes

To display the “Sample Attributes” reference, select it in the “References” section of the main menu.

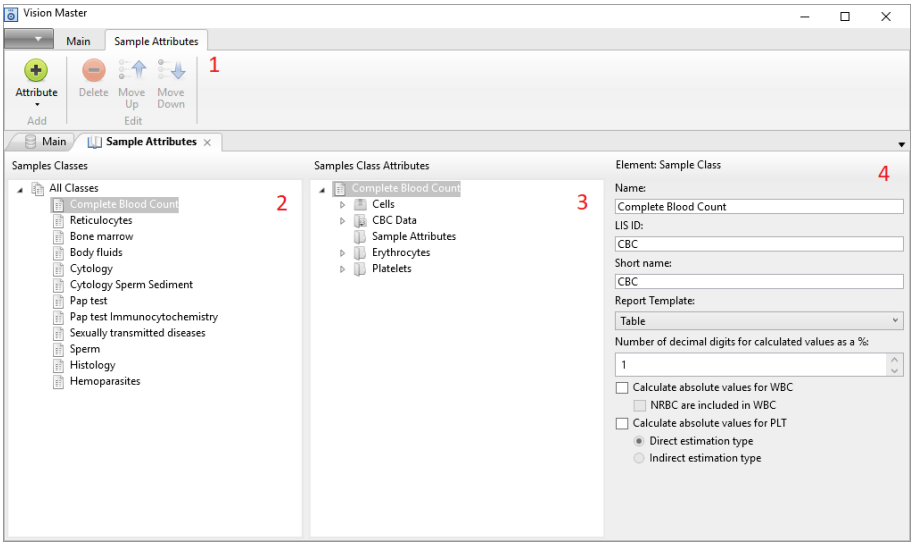


Fig. 108. General view of the reference window

The reference editor allows you to modify (add, delete, change) sample sections, classes and sample class attributes at your option.

The editor includes the following options:

1. Sample attributes control ribbon;
2. Samples classes;
3. Sample class attributes;
4. Attributes settings.

- “Number of decimal digits for calculated values as a %” — round off setting for calculated percentage values.

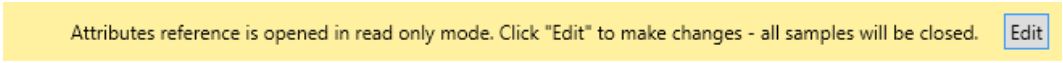


Fig. 109. Alert

Before starting the editing of sample attributes click the “Edit” button in the upper right corner of the screen. All samples are automatically closed when you start the editing.

Attention!

You will not be able set automatic calculation of Anisocytosis based on Microcytosis and Macrocytosis once CBC samples are added to the DB.

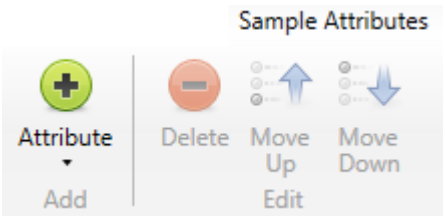


Fig. 110. “Sample Attributes” tab with tools

The “Sample Attributes” ribbon contains the following controls and tools:

- “Add” section:
  - “Attribute” — adds an attribute (a field in the report) to the sample class;

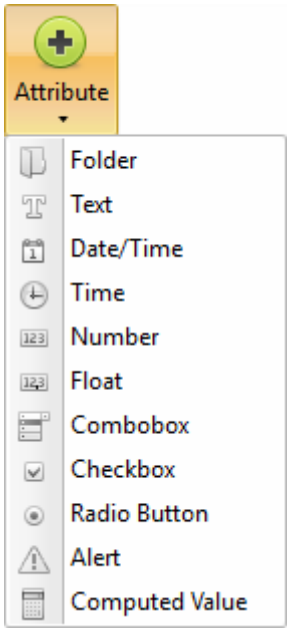


Fig. 111. “Attribute” drop-down list for “Sample Attributes” folder

- “Edit” section:
  - “Delete” — deletes an element;
  - “Move Up” — moves an element up;
  - “Move Down” — moves an element down.

5.12.2 Cities

To display the “Cities” reference, select it in the “References” section in the main menu.

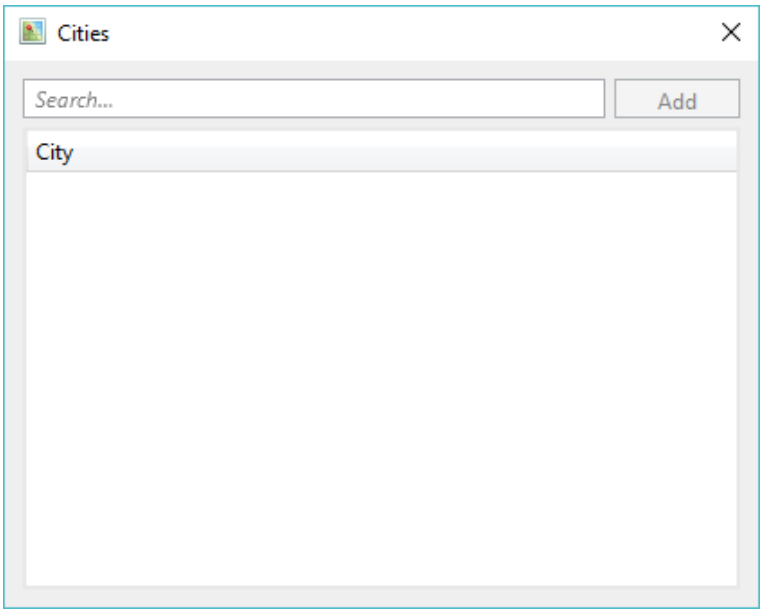


Fig. 112. General view of the “Cities” reference

The “Cities” reference editor allows adding cities to the database; these data will be used then for editing patient records.

The editor is presented as a list of cities.

To add a new city, enter its name and click the “Add” button.

To find the added city, enter its name or letters of that name. Any found matches will be displayed.

5.13 Tools

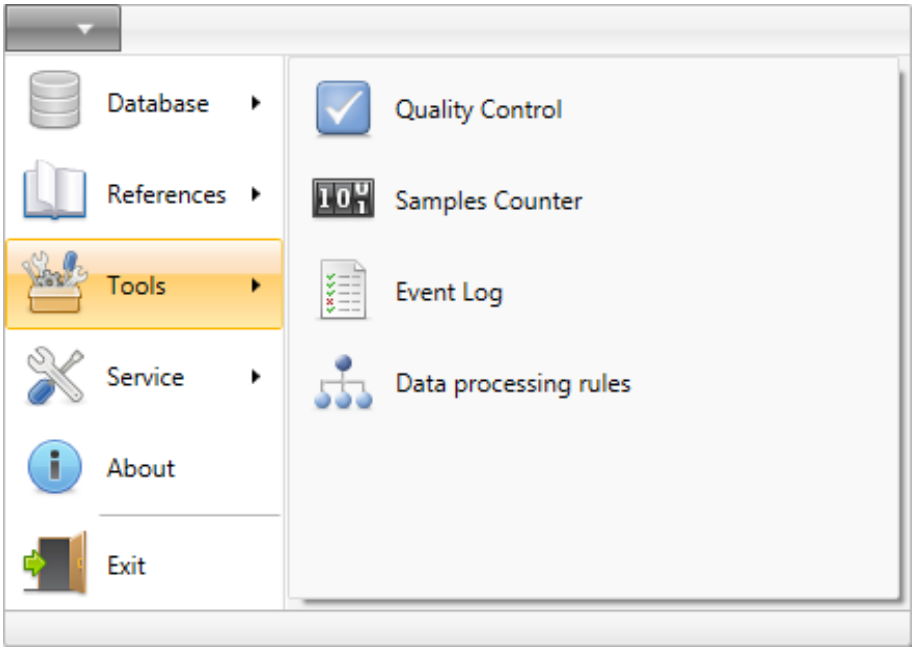


Fig. 113. Main menu, “Tools” section

The “Tools” section provides additional functions.

Vision software provides the following tools:

- “Quality Control” — validity analysis of data received during scanning;

- “Samples Counter” — remaining samples in the protection dongle.
- “Event log” — contains all user actions of sample creation and deletion, and changes of statuses.
- “Data processing rules” — automation of actions after sample scanning and data reception from external equipment.

5.13.1 Quality Control

To open “Quality Control”, select it in the “Tools” section of the main menu. The sample will be shown up in the “Quality Control” window when its status is set as “Completed”.

An important advantage of the Vision automatic image analyzer is its embedded mechanism of operational performance calculation that helps to evaluate diagnostic sensitivity (DSn) and specificity (DSp) — an estimated value of positive and negative results, and diagnostic efficiency (DE) — a credibility ratio of positive and negative results. You can get data for a certain sample or pooled data for a whole series of analyses.

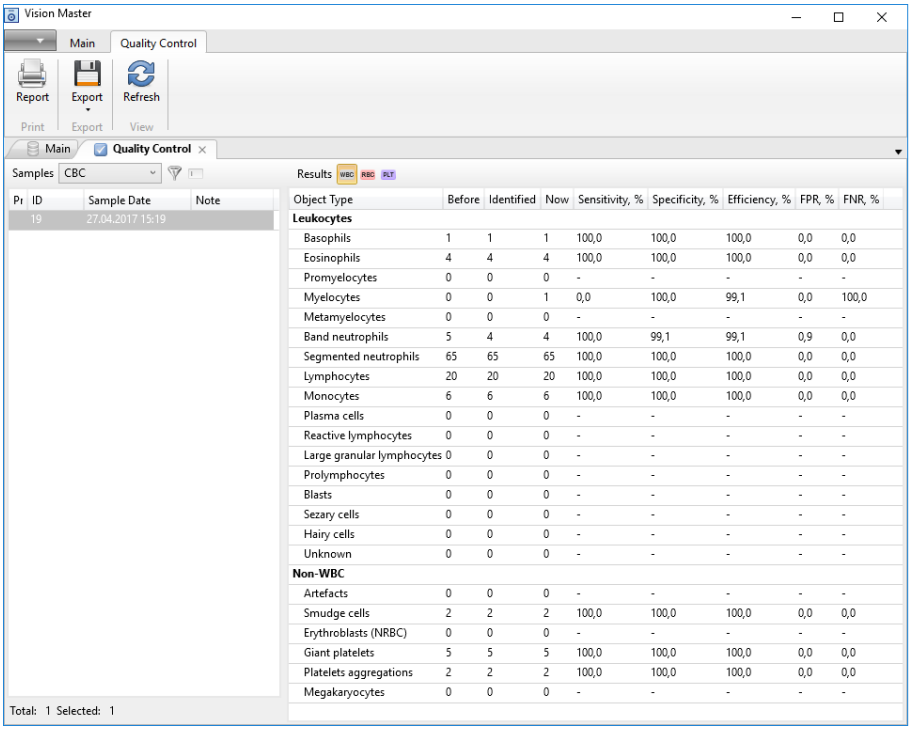


Fig. 114. General view of the “Quality Control” window

The “Quality Control” window consists of three sections:

- “Quality control” ribbon:
  - “Report” — prepares a report on quality control;
  - “Export”:
    - “Preclassification results” — open a window for export of preclassification results in .csv format;
    - “Validation results” — opens a window for export of validation results in .csv format;
  - “Refresh” — refreshes data;
- Sample list (uneditable information). Sample type (CBC[38], RET[38], Bone marrow[38], BF[38], Pap[38], Pap ICC[38], STDs[38]) is selected in the drop-down list.
  - “Reference Range” — warns about off-range results;
  - “ID” — identification number;

[38] Depends on delivery package

  - “Date” — sample collection date;
  - “Comment” — contains sample comments.
- Results — table of uneditable information for each sample type.
  - “Object type” — types of cells found during scanning;
  - “Before” — original amount;
  - “Identified” — amount of correctly identified objects;
  - “Now” — amount of objects after validation;
  - “Sensitivity” — diagnostic sensitivity;
  - “Specificity” — diagnostic specificity;
  - “Efficiency” — diagnostic efficiency;
  - “FPR” — false positive rate;
  - “FNR” — false negative rate.

To create a report, select one or several samples and click the “Report” button.

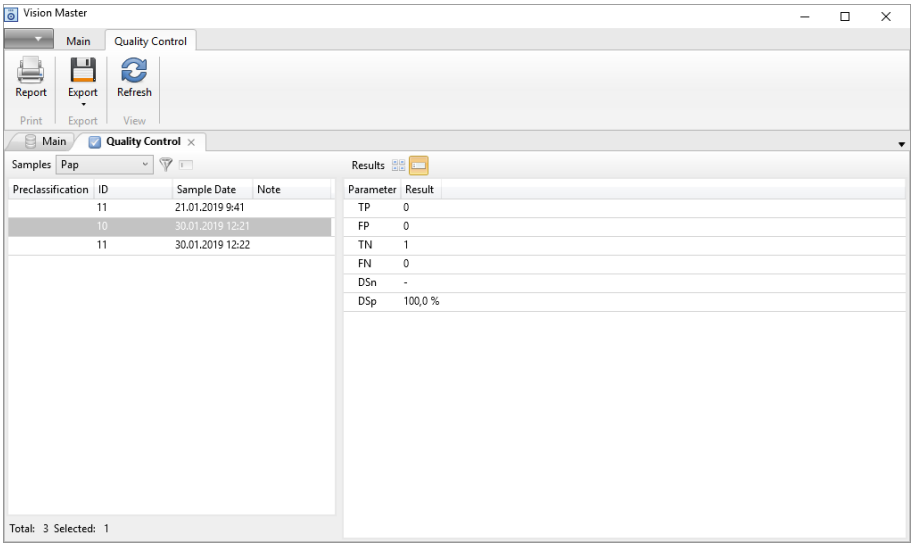


Fig. 115. Quality control for Pathology/Norm

For Pap[39], Pap ICC[39] and STDs[39] samples there is a quality control tab for Pathology/Norm.

The “Results” table contains sample classification results with the following parameters:

- TP (True Positive) — there is at least one pathological element correctly identified as pathological;
- FP (False Positive) — there is at least one non-pathological element incorrectly identified as pathological;
- TN (True Negative) — non-pathological elements are identified correctly; pathological elements are absent;
- FN (False Negative) — pathological elements are identified incorrectly; pathological elements are present;
- DSn — diagnostic sensitivity;
- DSp— diagnostic specificity.

[39] Depends on delivery package

5.13.2 Event Log

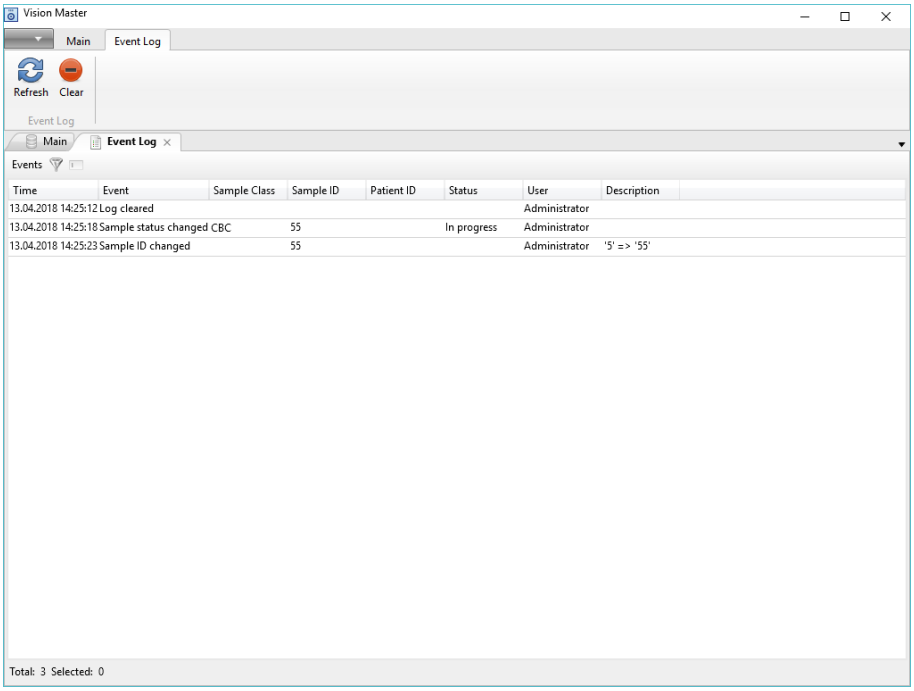


Fig. 116. Event log

To display the Event log, select it in the “Tools” section of the main menu. The Event log serves to displays the user activity.

The Event log is presented as a table with the following fields:

- “Time” — date of the event;
- “Event” — short description of the event;
- “Sample” — sample attached to the event;
- “Sample ID” — sample’s identification number;
- “Patient ID” — patient’s identification number;
- “Status” — remoteness of the event;
- “User” — responsible for the event;
- “Description” — additional notes to the event.

The “Event Log” ribbon contains the following controls:

- “Event Log” section:
  - “Refresh” button renews the displayed information;
  - “Clear” button resets the event log.

5.13.3 Data processing rules[40]

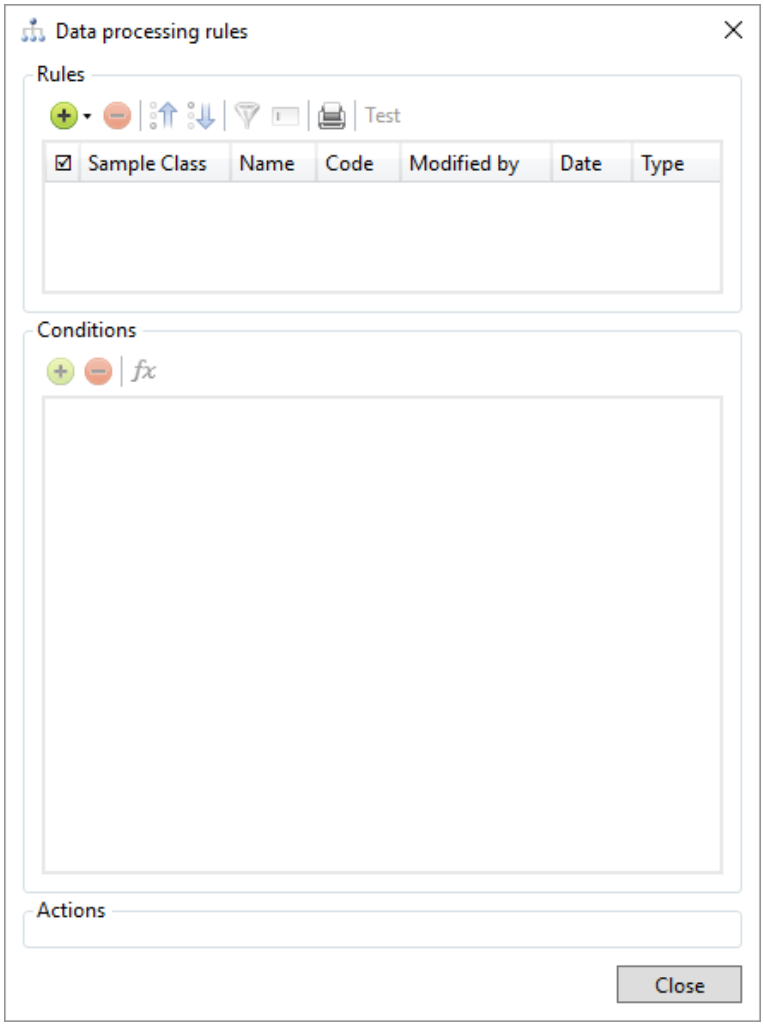


Fig. 117. Data processing rules

To display “Data processing rules”, select it in the “Tools” section of the main menu. Data processing rules are intended for automation of actions after sample scanning and data reception from external equipment.

The “Data processing rules” window is comprised of three sections:

- “Rules” — list of rules:
- “Conditions” — conditions for execution of a selected rule;
- “Actions” — actions that will be performed when the selected conditions are met.

Condition parameters:

- CBC data;
- Microscopy data;
- Flags;
- Age;
- Gender.

The rules can be printed out by clicking the "Print" button and imported/exported via "Menu" | "Database".

[40] Depends on delivery package

5.14 Service

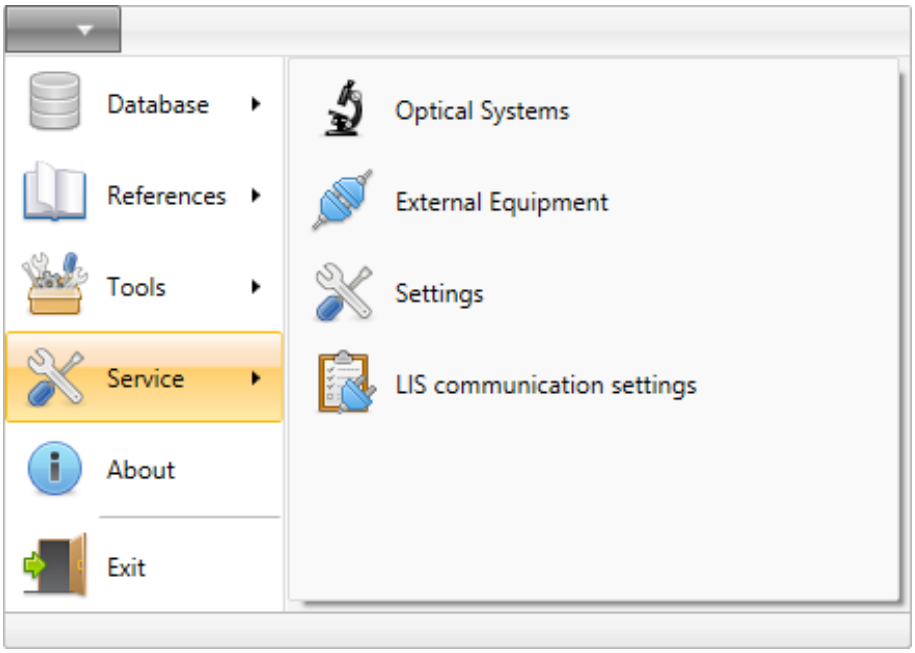


Fig. 118. Main menu, “Service” section

The “Service” section includes the settings of the equipment used by the program and the settings of the program.

The Vision applications contain the following service elements:

- “Optical Systems” — optical systems adjustment;
- “External Equipment” — external equipment settings;
- “Settings” — program management;
- “LIS communication settings”.

5.14.1 Optical Systems

To display the “Optical Systems” reference, select it in the “Service” section of the main menu.

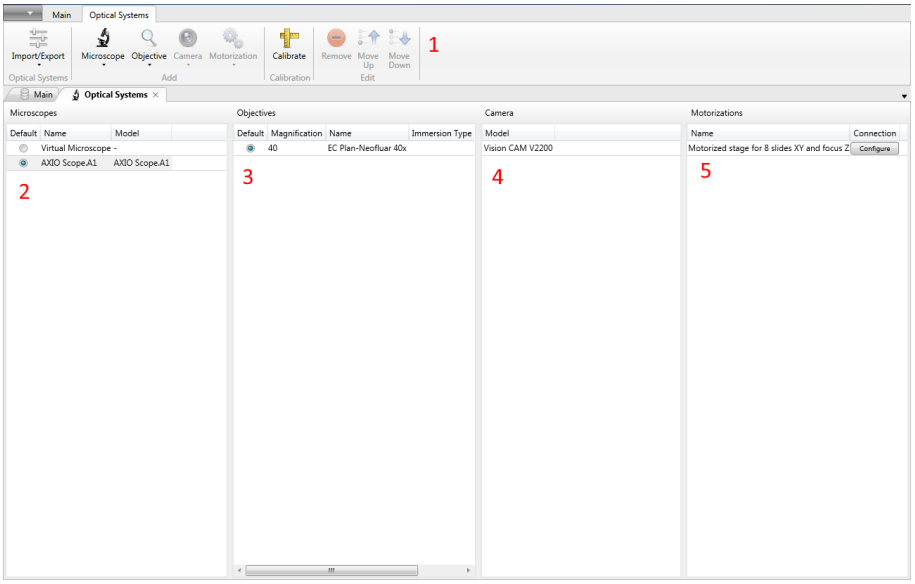


Fig. 119. Optical systems management window

The “Optical Systems” service section allows adding optical systems (microscopes, objectives and cameras) and motorization sets to the database, this data are needed to anchor them to images and to calculate parameters after calibration.

Attention!

After updating the application you will need to readjust the Optical System, using Hardware Configurator. Export the Optical System from the previous version and then import it after updating Vision.

The Optical Systems service consists of five sections:

1. Optical Systems ribbon;
2. List of created optical systems;
3. List of created objectives;
4. List of cameras;
5. Motorization set.

You can select one of the optical systems as a default option, to do that, select a camera and a motorized stage. If an optical system contains several objectives, you select one as a default option. You need to select a camera and a motorized stage for each optical system. After the motorized stage is added, it should be adjusted (see the paragraph 5.14.1.5).

The “Optical Systems” ribbon contains the following controls:

- “Optical Systems” section:
  - “Import/Export” — importing/exporting of the configuration files
- “Add” section:
  - “Microscope” — selects an optical system;
  - “Objective” — selects objectives;
  - “Camera” — selects cameras;
  - “Motorization” — selects motorized stages;
- “Calibration” section:
  - “Calibrate” — calibrates cameras and objectives;
- “Edit” section:
  - “Remove” — deletes the selected element;
  - “Move Up” — moves an element up;
  - “Move Down” — moves an element down.

5.14.1.1 *“Import/Export” Drop-Down List*

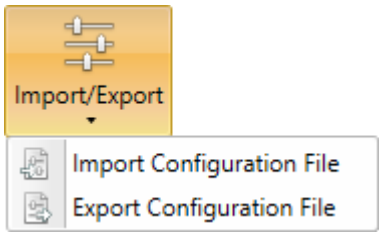


Fig. 120. “Import/Export” drop-down list

- “Import Configuration File” — allows opening and saving a configuration file in the reference;
- “Export Configuration File” — allows saving a configuration file on the computer hard disk.

5.14.1.2 *"Microscope" Drop-Down List*

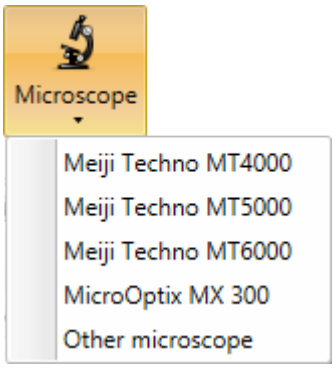


Fig. 121. "Microscope" drop-down list

The "Microscope" drop-down list contains the list of optical systems which can be connected to Vision. Select a device installed on your working place. Once selected, it will be shown in the list of your optical systems. To select the added optical system as a default one, place the radio-button by the corresponding option.

5.14.1.3 *"Objective" Drop-Down List*

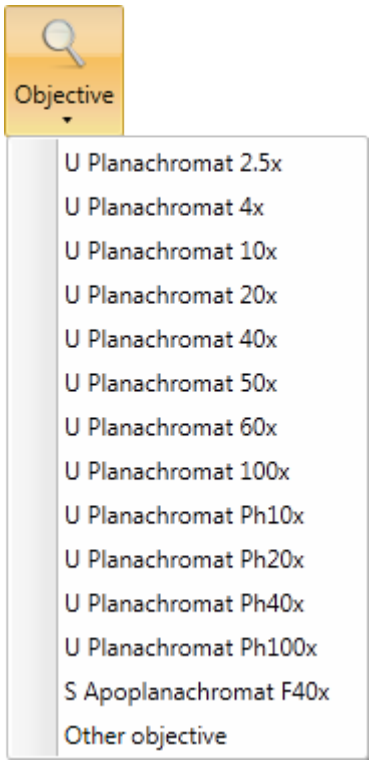


Fig. 122. "Objective" drop-down list

The "Objective" drop-down list contains the list of objectives that can be connected to the microscope selected on the previous step. Select an objective which will be used with the Vision software. The selected option will appear in the list of objectives. You can select several objectives for one optical system. To set an objective as a default one for a specified optical system, place the radio button by the corresponding option.

Objectives operating with immersion oil have "Oil" in their names.

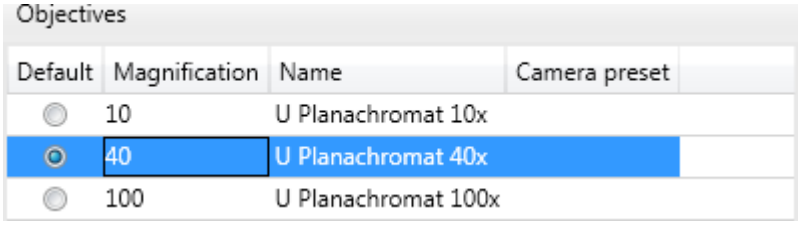


Fig. 123. Selecting a default objective

5.14.1.4 *"Camera" Drop-Down List*

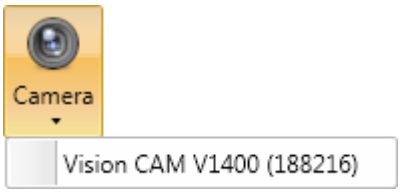


Fig. 124. "Camera" drop-down list

The "Camera" drop-down list includes a list of cameras connected to the computer. Select a camera which will be used with Vision. The selected option will show up in the list of cameras. If the camera was added before, the button will be disabled.

5.14.1.5 *"Motorization" Drop-Down List*

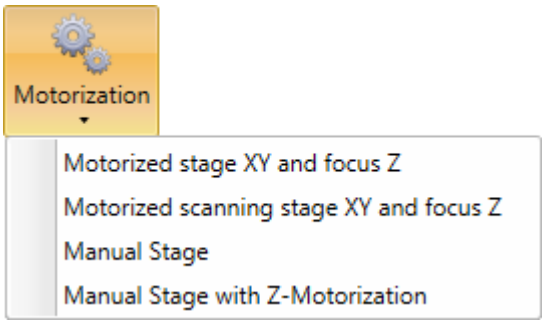


Fig. 125. "Motorization" drop-down list

The "Motorization" drop-down list contains a list of available motorized stages. Select a stage which will be used with Vision. The "Motorization" button and the "Camera" button are disabled after the device is selected.

After the stage is added, it has to be adjusted. To activate it, click "Settings".

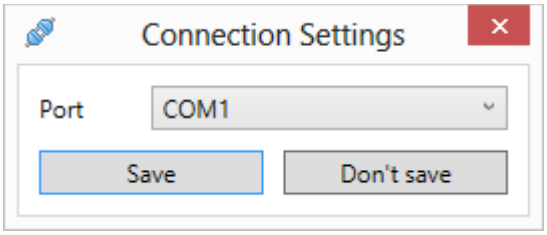


Fig. 126. Connection settings

You can select the required settings: a port to connect the device to, data transfer speed, etc. After all options are selected, click "Save", and the "Motorization" line will be enabled.

You can see which port is used for a certain device in the "Control Panel" | "Hardware and Sound" | "Device manager" for Windows 7.

5.14.1.6 *"Calibrate" Button*

Fig. 127. "Calibrate" button

The "Calibrate" button is used to define measurement units for work with a camera, live video and images. The calibration is needed to work with the Scanner.

Create a new optical system selecting a microscope or importing it from a file. Then, select a default objective, a camera and a motorized stage (see details in the following sections). Place a calibration glass under the objective and click the "Calibration" button, a live video panel and a calibration bar will show up.

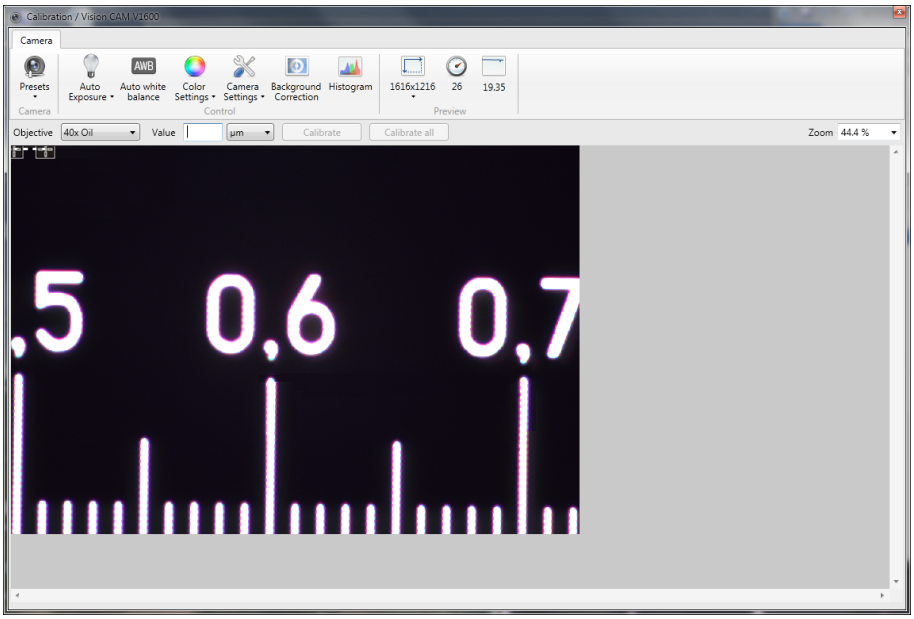


Fig. 128. Calibration ruler on live video

Specify values and units for the calibration bar, place the calibration bar on the image of the micrometer object and click "Calibrate" (to calibrate one objective of the optical system) or "Calibrate all" (to calibrate all objects of the optical system).

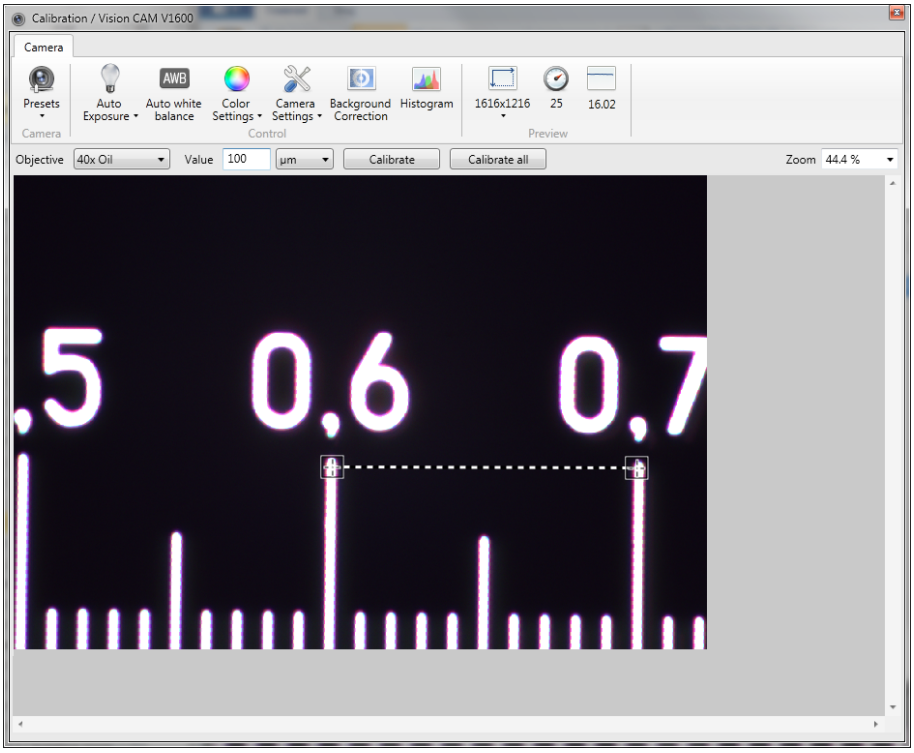


Fig. 129. Calibrated ruler on video

The icon changes after calibration.

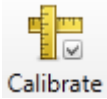


Fig. 130. Calibration icon of a calibrated optical system

5.14.2 External Equipment

To open the “External Equipment” service, select it in the “Service” section of the main menu.

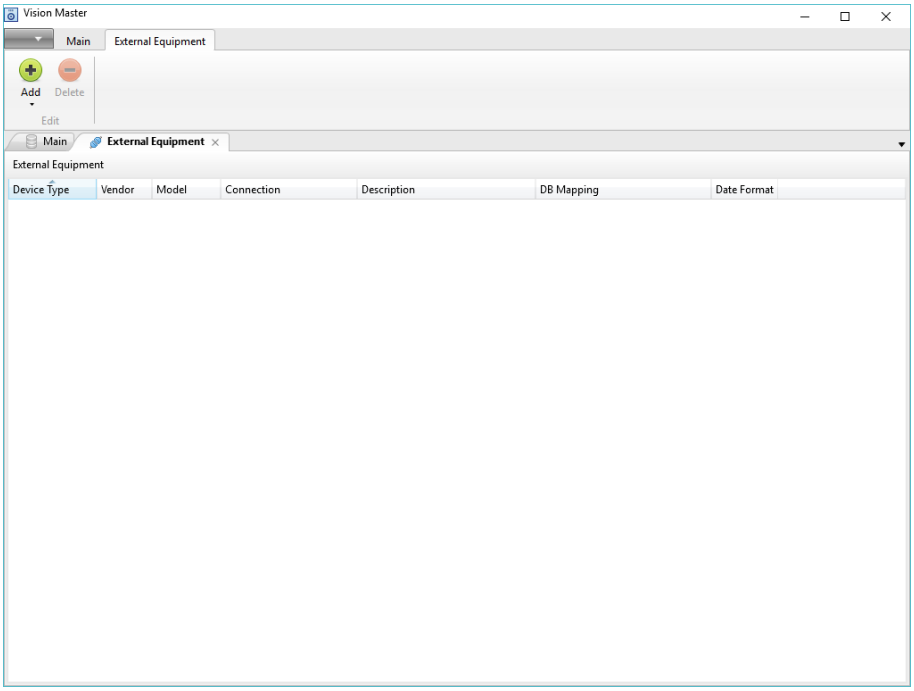


Fig. 131. General view of the “External Equipment” dialogue

The “External Equipment” service is used to add devices to the database. These data are needed for fine adjustment of the devices and the reception of sample.

Attention!

After updating the application, you will need to readjust all used external equipment.

The External Equipment service consists of two sections:

- “External Equipment” ribbon;
- Table of equipment with the following fields:
  - Device Type;
  - Vendor;
  - Model;
  - Connection;
  - Description;
  - DB Mapping;
  - Date Format.

5.14.3 Settings

To open the “Settings” service, select it in the “Service” section of the main menu.

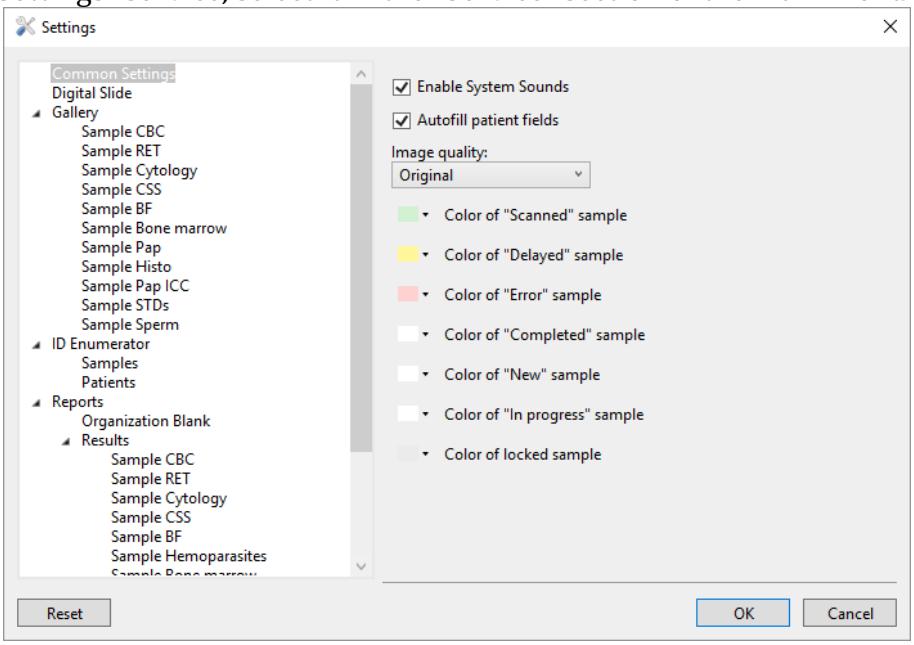


Fig. 132. Common settings

User settings of the application are displayed here:

- “Common settings”:
  - “Enable system sounds” — check to switch on sound notifications;
  - “Autofill patient fields” — on/off checkbox for automatic filling of patient’s fields in the patient editor;
  - “Image quality” — drop-down list with “Original”, “Sharpen” and “Magic Cell” options for WBC images;
  - Color markings for samples depending on the status. Clicking the drop-down list will open the color settings window. Select a color from the standard palette or switch to extended one to set the color manually.
- “Gallery”:
  - “Sample CBC”[41]:
    - “Cytoplasm Mask Color” — color selection and opacity settings;
    - “Nucleus Mask Color” — color selection and opacity settings;
    - “Lymphocyte display on the ruler” — on/off checkbox for “Lymphocyte” element display;
    - “RBC/PLT size, µm” — area size for cell selection.
  - “Sample RET”[41], “Sample BF”[41], “Sample Cytology”[41], “Sample CSS”[41], “Sample Pap”[41], “Sample Pap ICC”[41], “Sample STDs”[41], “Sample Histo”[41]:
    - “Lymphocyte display on the ruler” — on/off checkbox for “Lymphocyte” element display;
    - “Element size, µm” — area size for cell selection.
  - “Sample Bone Marrow”[41]:
    - “Lymphocyte display on the ruler” — on/off checkbox for “Lymphocyte” element display;
    - “100x element size, µm” — area size for cell selection on the 100x tab;
    - “10x element size, µm” — area size for megakaryocytes selection on the 10x tab;

[41] Depends on delivery package

        - "ROI element size, μm" — area size for ROI selection on the 10x tab;
- "ID enumerator":
    - "Samples":
        - "ID Enumerator" — turns the automatic numeration of samples on/off;
        - "Prefix";
        - "Number Length";
        - "Suffix";
        - "Current number";
    - "Patients":
        - "ID Enumerator" — turns the automatic numeration of patient records on/off;
        - "Prefix";
        - "Number length";
        - "Suffix";
        - "Current number";
- "Reports":
    - "Organization blank":
        - "Organization information"/"Output Fields" — check the fields you wish to include in the report;
        - "Name" — organization name;
        - "Laboratory" — laboratory name;
        - "Logo" — organization logo;
        - "Analysis information"/"Output Fields";
        - "Patient information"/"Output Fields";
        - "Comments";
        - "Approved";
        - "Name" — name of the specialist signing the form;
        - "Position" — occupation of a specialist signing the form;
    - "Results":
        - "Sample attributes";
        - "Result interpretation";
        - "Notes";
        - "Include only labeled images";
        - "Display empty values";
            - "Sample CBC"[42]:
                - "Available items";
                - "Displayed items";
                - "Erythrocyte Groups";
                - "Rule" — checkbox for display of the applied rule;
            - "Sample RET"[42]:
                - "Available items";
                - "Displayed items";
                - "Rule";
            - "Sample Cytology"[42], "Sample CSS"[42], "Sample Histo"[42]:
                - "Digital slide";
                - "Results";
                - "Gallery";
            - "Sample Bone Marrow"[42], "Sample BF"[42], "Sample Pap ICC"[42], "Sample STDs"[42]:

[42] Depends on delivery package

        - "Digital slide";
        - "Rule";
        - "Results";
        - "Gallery";
    - "Sample Hemoparasites" [43]:
        - "Results";
        - "Thick smear gallery";
        - "Thin smear gallery";
    - "Sample Pap"[43]:
        - "Digital slide";
        - "Pap test values";
        - "Rule";
        - "Results";
        - "Thin smear gallery";
- "Images output":
    - "Show cell galleries columns" — drop-down list for the number of columns;
    - "Show common frames columns" — drop-down list for the number of columns;
    - "Auto-Fill" — automatic filling of the cell gallery.
- "Print":
    - "Print without preview";
    - "Print automatically after sample validation".

The "Reset" button cancels user interface settings. Clicking the button will display a warning window. Confirming will restart the application.

[43] Depends on delivery package

5.14.4 LIS communication settings

LIS communication settings are only active if the server DB is connected and the Vision application is run with local administrator rights. To open the “LIS communication settings” service, choose “Service” | “LIS communication settings” in the main menu.

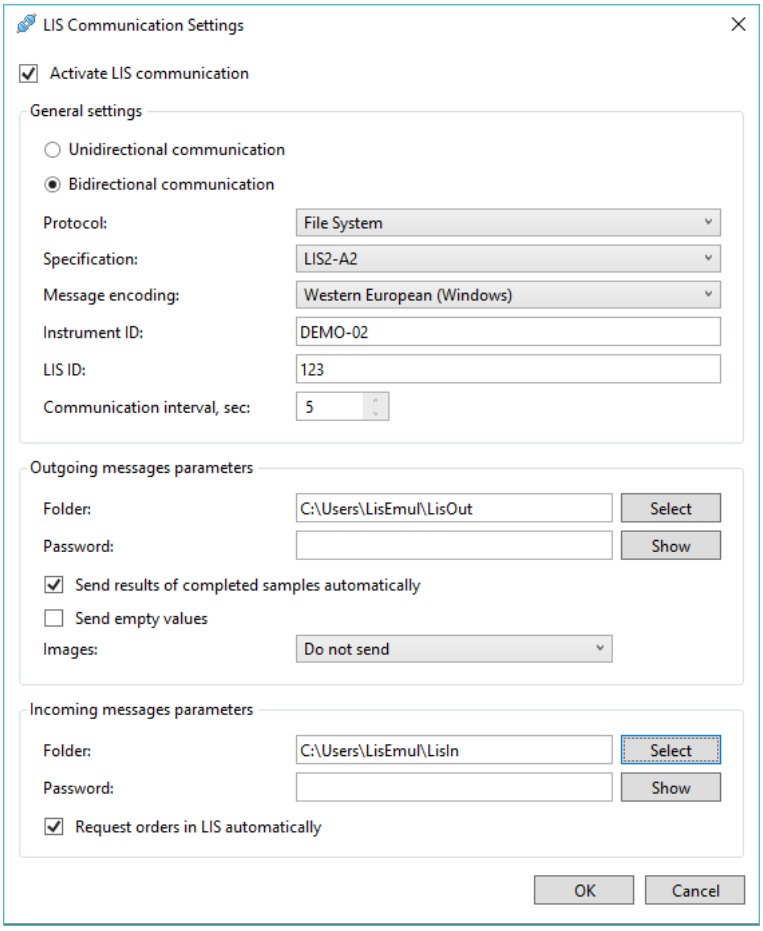


Fig. 133. LIS communication settings

Laboratory information system (LIS) is the software for control of the laboratory operations and documentation. “LIS communication settings” contains option of communication between Vision and the LIS.

This section contains the following settings:

- “Activate LIS communication” — LIS communication on/off checkbox. Turned off by default;
- General settings:
  - “Unidirectional communication” — the Vision only sends results to the LIS. The choice of unidirectional or bidirectional communication depends on the used LIS;
  - “Bidirectional communication” — the Vision receives orders from the LIS for tests and send the results of completed orders back to the LIS. The choice of unidirectional or bidirectional communication depends on the used LIS;
  - “Protocol”
    - “File System” — used for communication between the Vision application and LIS file system;
    - “TCP/IP” — use of Internet connection for message communication;
  - “Specification”:
    - LIS2-A2;
    - HL7;

    - “Message encoding” — selection of encoding method from a drop-down list. The selected encoding should match the LIS encoding for correct operation;
    - “Instrument ID” — name of your working station;
    - “LIS ID” — name of the LIS;
    - “Communication interval, sec” — LIS communication interval in seconds;
    - “LIS acknowledge timeout, sec” — only for TCP/IP protocol, LIS server reply timeout period;
- “Outgoing messages parameters” (File System Protocol):
    - “Folder” — storage folder for outgoing Vision messages;
    - “Password” — access password for outgoing messages, should match the corresponding password in the LIS;
    - “Send results of completed samples automatically” — examination results of “Completed” samples will be automatically sent to the LIS;
    - “Send empty values” — on/off checkbox for sending of codes for empty fields;
    - “Images” — drop-down list with settings for sending sample full frames and WBC images of CBC samples:
        - “Do not send”;
        - “Send all”;
        - “Send marked only”;
- “Outgoing messages parameters” (Only for TCP/IP Protocol):
    - “Host (IP Address: Port)” — IP-address and port of the server with installed LIS and set Internet connection;
    - “HL7 specification version” — selection of HL7 specification version is only available when selecting the “HL7” specification;
- “Incoming messages parameters” (active only with “Bidirectional communication”):
    - “Folder” — storage folder for incoming Vision messages;
    - “Password” — access password for incoming messages, should match the corresponding password in the LIS;
    - “Request orders in LIS automatically” — when adding a sample via a barcode or hematology analyzer, the information about the sample’s properties will be automatically requested from the LIS.

Once all parameters are set, click “OK” to save the settings and close the window or click “Cancel” to close the window without saving.

6 Getting Started

Important!
Installation of the Vision motorized kit on an unstable table susceptive to vibration may affect the precision of the samples results.

Important!
External vibrations may affect the focus mechanism performance and lead to an unexpected scan error/stop, therefore important cells might not be captured which affects the diagnosis to the patient.

6.1 Creating an optical system

The first thing you need to do to get started is to create an optical system. Calibration is a mandatory procedure for creating an optical system. This chapter describes the procedure of creating and calibrating an optical system.

6.1.1 Calibrating an Optical System using a Vision Camera

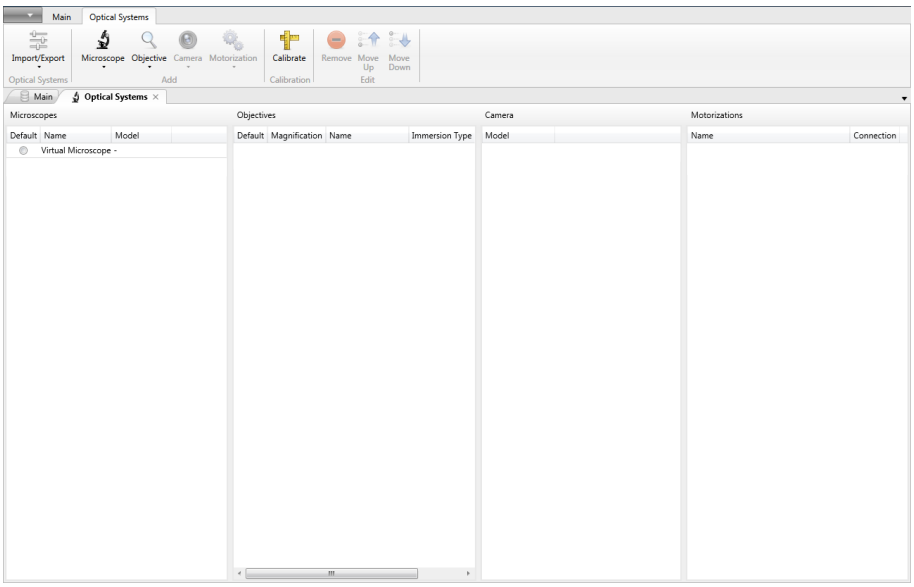


Fig. 134. General view of the “Optical systems” management window

1. Add your optical system to the reference. Select the “References” | “Optical systems” option in the main menu.

Select a microscope, an objective, a camera and a motorized stage.

To add an optical system or an objective, click the corresponding buttons: “Microscope”, “Objective”, “Camera” or “Motorization” [Enter].

Using the radio button, select the default objective, according to the objective the current optical system will be set as default. Click “Configure” to check the motorized stage settings and select the options.

Attention!

After updating the program, you will need to reconfigure the optical systems via Hardware Configurator. Export the Optical System from the previous version and then import it after updating.

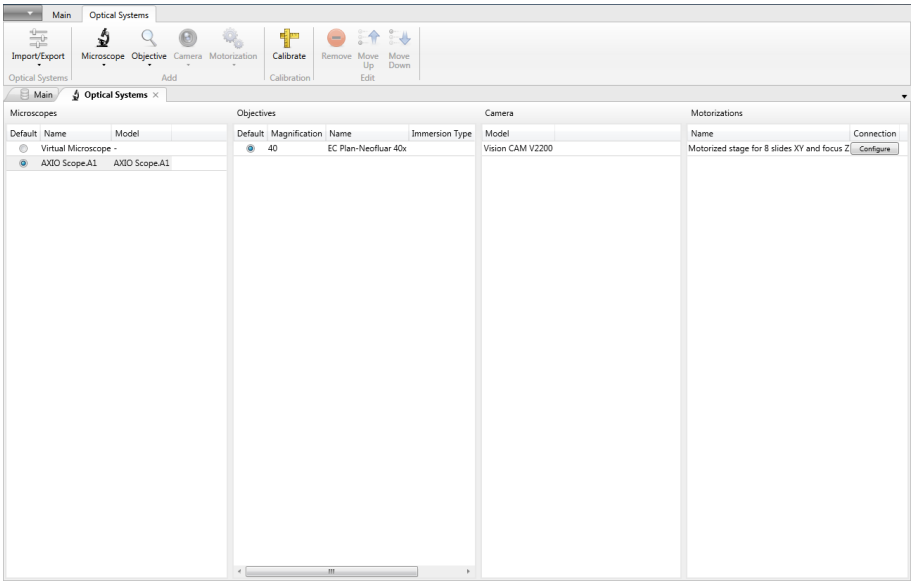


Fig. 135. Optical system with added microscope, objective, camera and motorization

2. Make sure that the camera is on. Place the micrometer object on the microscope stage. Click the “Calibrate” button.

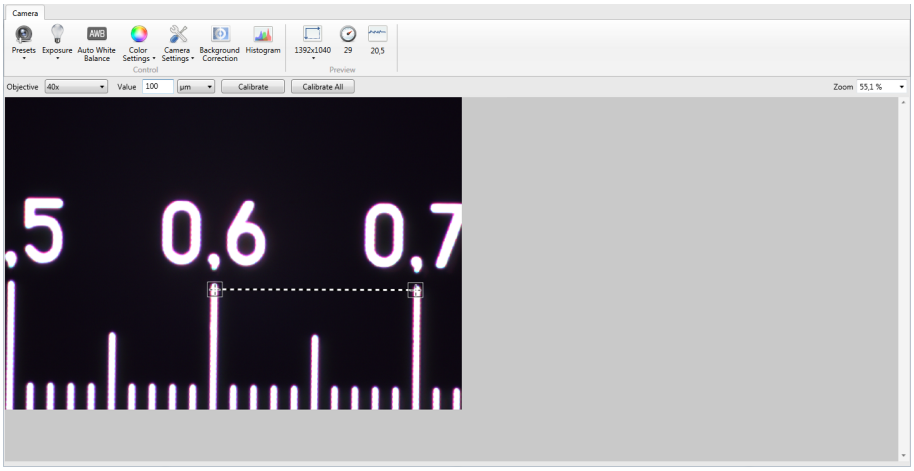


Fig. 136. Calibration window

Important!

Misalignment of the camera during the installation may affect the quality of the sample.

3. Indicate the value and the unit for the calibration bar, set the bar on the micrometer object image and click “Calibrate” (to calibrate one objective of the optical system) or “Calibrate all” (to calibrate all objectives of the optical system).

You can calibrate each objective separately (for more accurate results) or all objectives at once.

The icon will change its appearance after calibration.

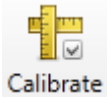


Fig. 137. Calibration icon of a calibrated optical system

6.1.2 Calibrating a Motorized Kit during scanning

1. On the first run the scanner will perform an automatic calibration of the motorization, defining the slide size in the conventional coordinate system.

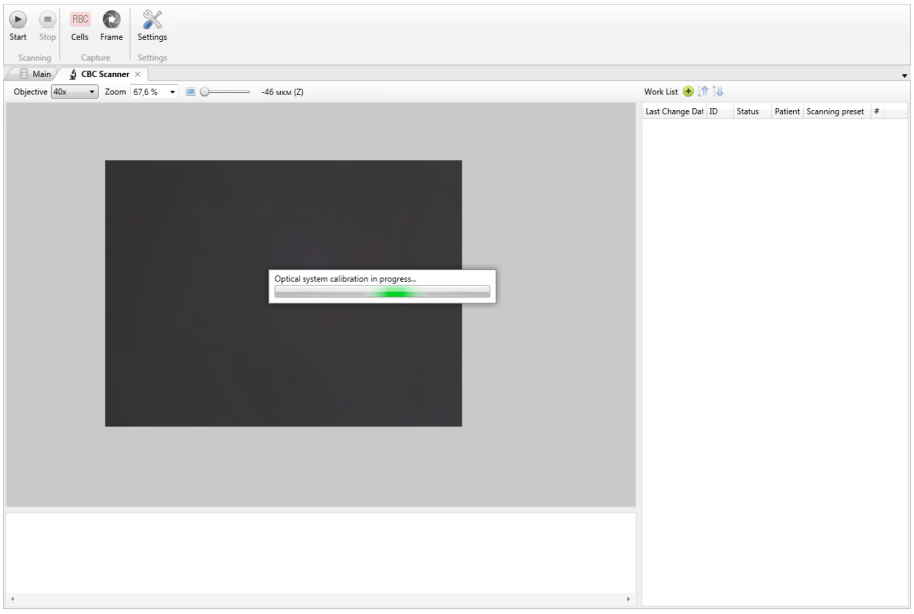


Fig. 138. Automatic calibration of an optical system

2. You can also start the calibration of an optical system manually by clicking the “Calibration” button on the “Motorization” ribbon.

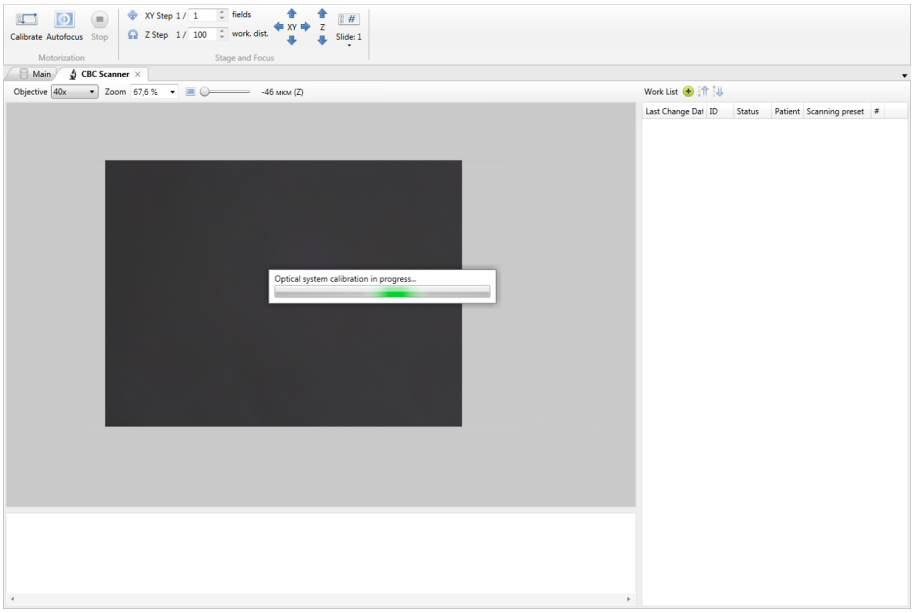


Fig. 139. Calibration in the “Motorization” ribbon

Important!
The loss of calibration or scanning precision caused by moving the kit to a different workplace may lead to a wrong interpretation of sample examination results and consequently to inaccurate diagnosis to the patient.

6.2 Performing scanning using a motorized stage

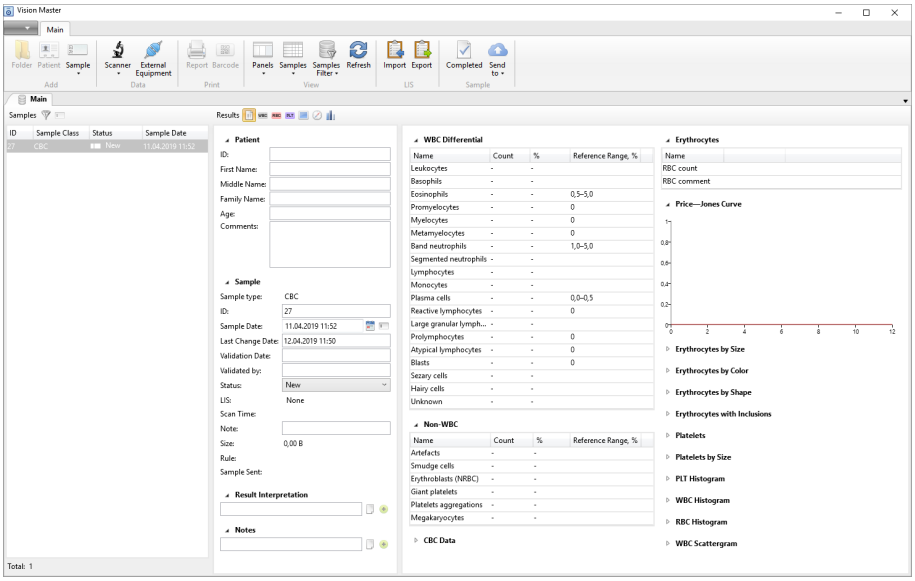


Fig. 140. Main window

1. Click the “Scanner” button in the main window.

On the first run the program will perform an automatic calibration of the optical system.

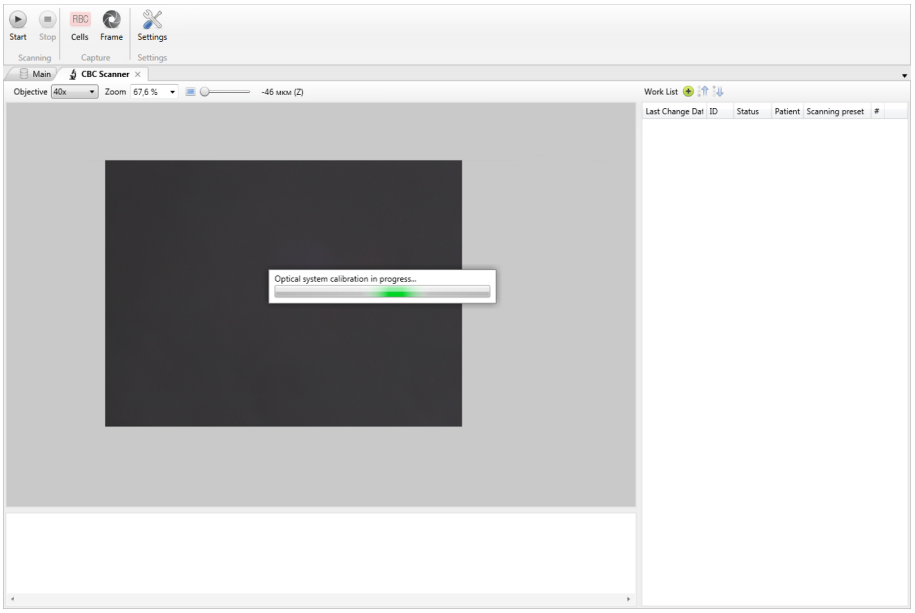


Fig. 141. Automatic calibration of an optical system

2. Turn the microscope on and place the smear in the device.

Attention!

Using a non-conform pre-analytic may cause a loss of scanning precision.

Attention!

During motorized focusing operation do not attempt to force stop the focus knob rotation with your hand, etc as this may damage the device.

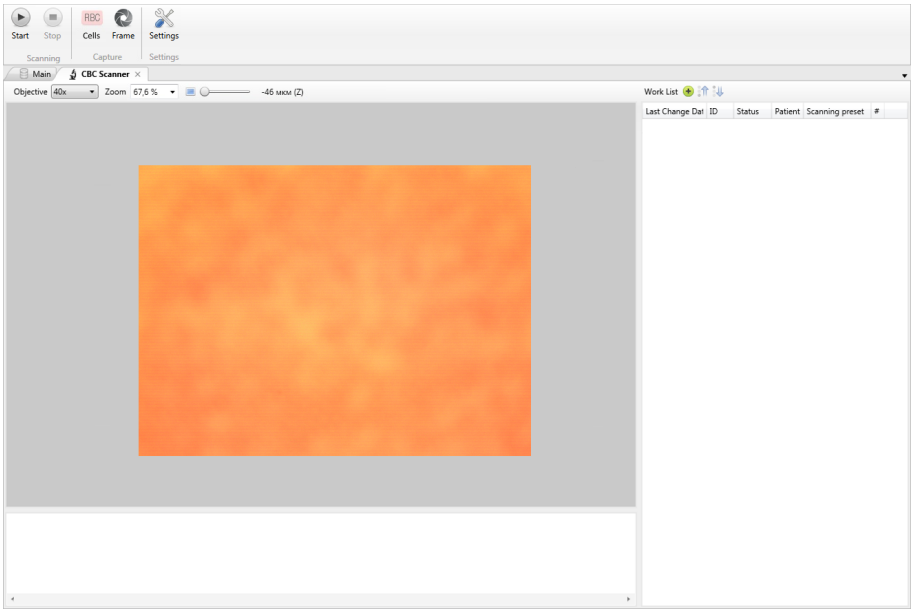


Fig. 142. Scanner window with a switched on microscope

Important!
Use of samples prepared with procedural violation may lead to incorrect interpretation of scanning results and consequently to inaccurate diagnosis to the patient.

Important!
Using wrong or too viscous immersion oil affects the scanning precision, therefore important cells might not be captured, which affects the diagnosis to the patient.

Warning!
Please wear laboratory gloves every time handling immersion oil to avoid skin irritation.

3. Adjust the image using the joystick; you also can use the “Autofocus” tool on the “Motorization” tab and image settings on the “Camera” tab (“Automatic white balance”, “Automatic exposition”, “Color Settings”, etc.).

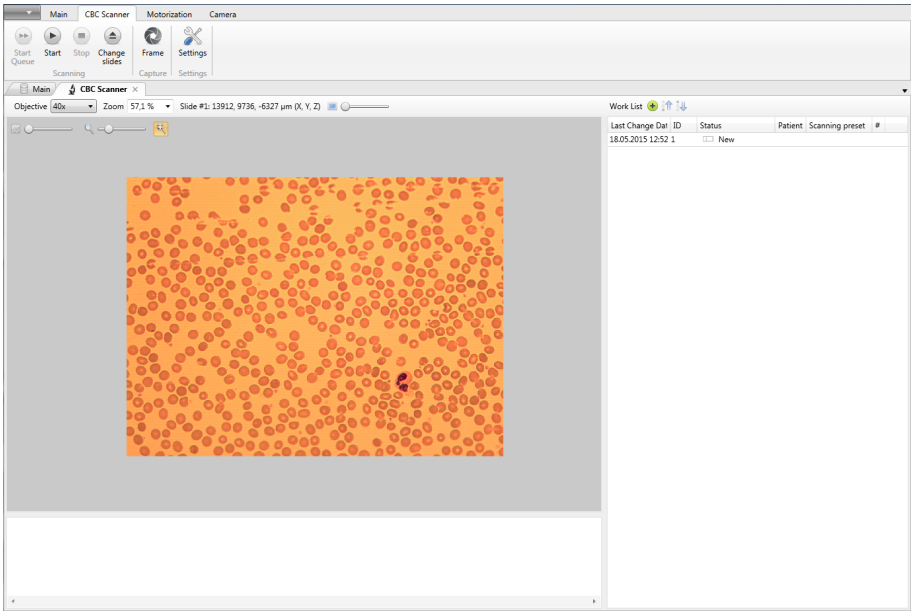


Fig. 143. Adjusted image

4. Click the “Add Sample” button on the “Scanner” tab. The “Start” button starts the scanning and becomes active when there is at least one sample in the queue. You should set the amount of RBC and WBC to be found during the scanning. 200 WBC and 500 RBC are set on the picture, consequently, the scanning will continue until the scanner finds 200 WBC and 500 RBC. To display the locations of found cells, click “Detection Control”. You can also set the scanning method, region width and path.

Click “Start” after the required preparations.

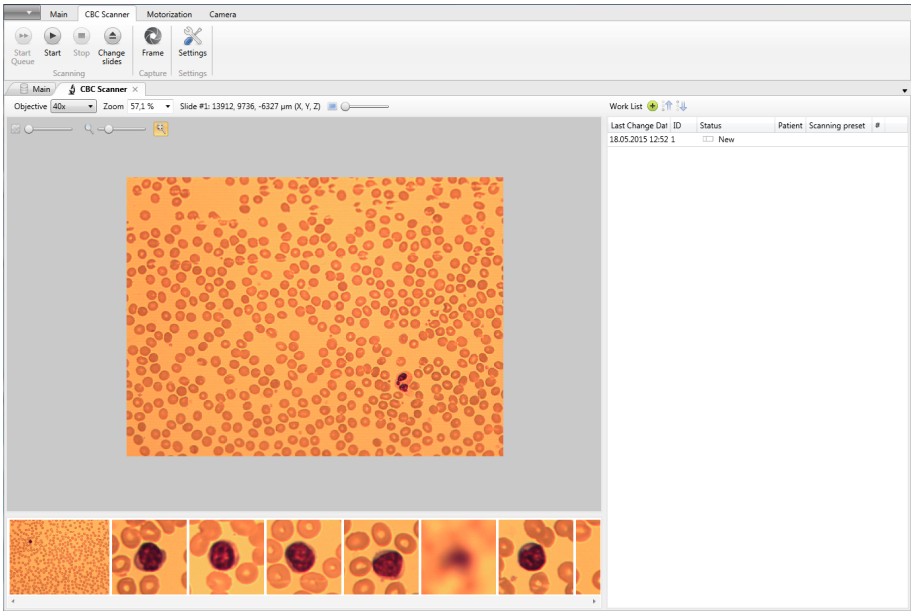


Fig. 144. Scanner in action

Attention!
When scanning a sample prepared with procedural violation — high pH value (~7.8), there is a possibility to capture false RBC as WBC and consequently the higher number artefacts and longer scanning time.

There is a service tweak to solve this problem:
<PropertySet name="expectedWBCCount" description="Expected number of leukocytes in the frame. Exceeding of the set number may indicate false

detection.">0</PropertySet>
Activation of the artefact/not artefact checking mode prior to focusing and WBC capture. The number of found leukocytes in the field is specified, after which the check begins.

Additional information on the use of the flag. At the moment the “expectedWBCCount” flag should be used cautiously and only when strictly necessary.

Vision Pro
On the smears with dark blue-gray RBC (increased pH) when RBC are falsely captured as WBC the recommended parameter value is expectedWBCCount = 10.
For normal smear staining, if the focus is perfectly adjusted, the parameter value = 1 is allowable. If the focus settings are not ideal, the parameter value may be not less than 5 (for normal blood and medium density of cells in the frame).

Pathological blood with high leukocytes count
Blood smears with 10-20 and more leukocytes per field may cause problems with capture as many clustered leukocytes will pass as artefacts. Thus it is not recommended to use low flag value.

⚠ **Attention!**
When scanning the blood smears with low leukocytes count <1 x10^9 cell/l, the scanning may take a long time.

There is a service tweak to solve this problem:
<PropertySet name="scanLimitTime" description="Scanning time restriction in seconds. Default value: 1200">1200</PropertySet
Scanning time limit. It set the amount of time after which the blood smear scanner will stop the scanning of a smear.

5. When the scanning is finished, go to the “Main” tab, the finished sample will change its status to “Scanned” and disappear from the scanner queue.

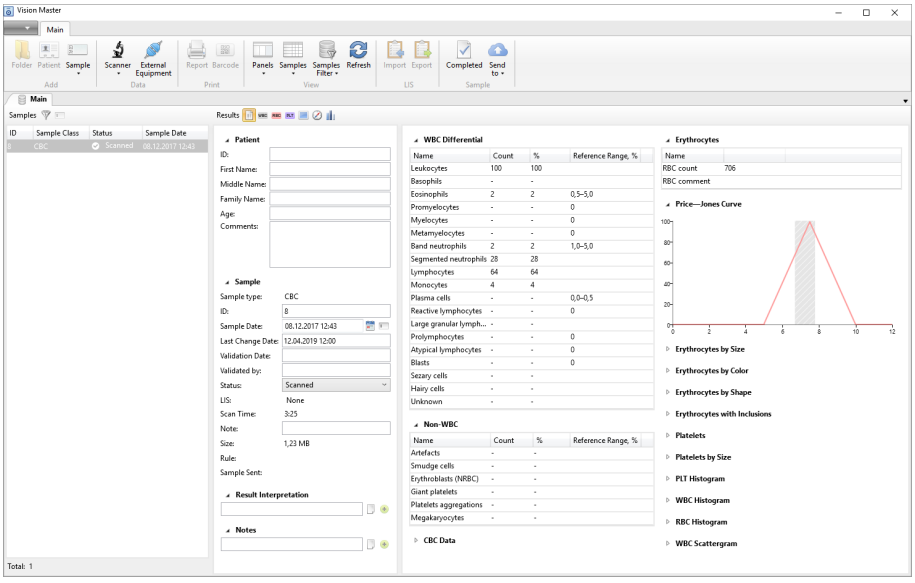


Fig. 145. Scanned sample

Change the sample status from “Scanned” to “Completed” and click “Report”. The name of the user who changed the sample status to "Complete" will be saved in the report.

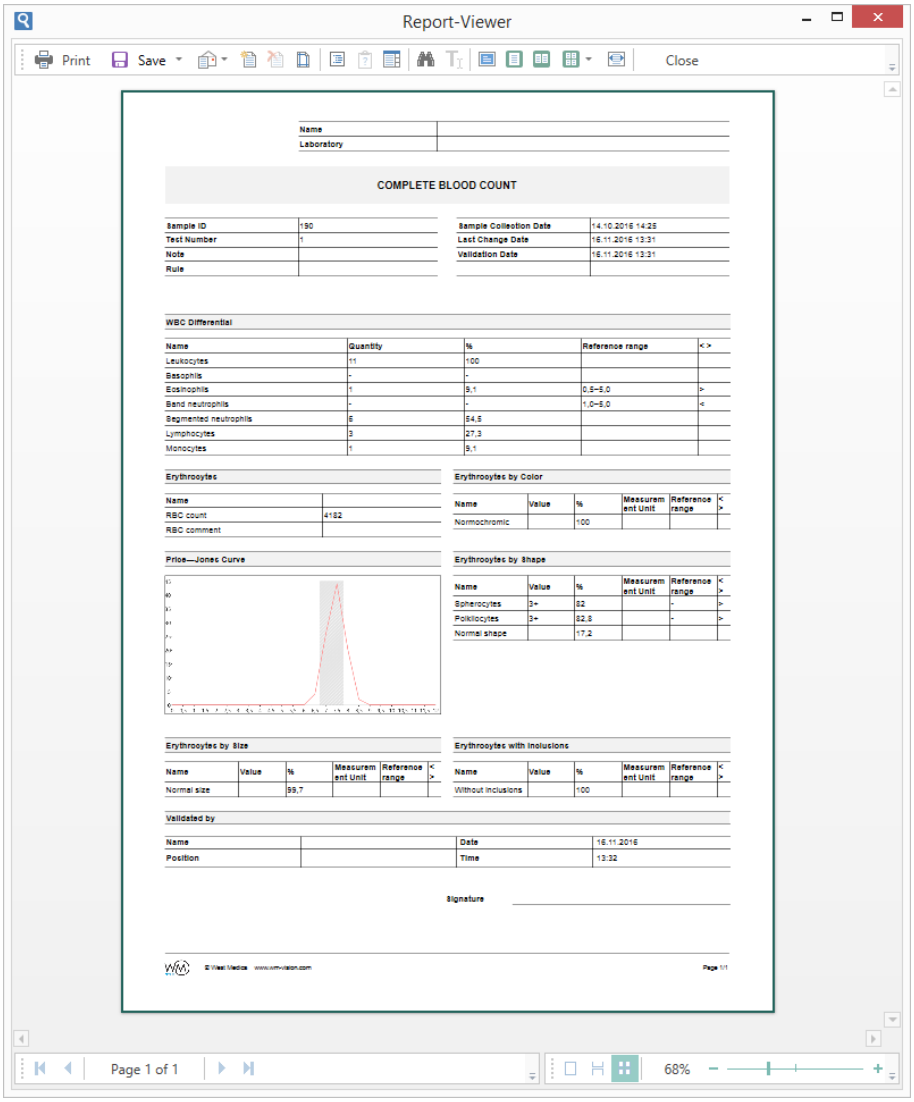


Fig. 146. Prepared report

6. Reports can be printed out, saved, exported or e-mailed.

6.3 Conducting a Sample Scanning with a Barcode Scanner and a Printer

Barcode scanner and printer are the external devices that you can use with the Vision Kit. If the slides have barcodes containing information on a certain sample attached to a patient, it reduces the number of possible human-made errors (e.g. attaching a sample to a wrong patient).

When a scanner and a printer are properly connected to the computer, they will automatically show up in the list of external equipment (“Main menu” | “Service” | “External equipment”).

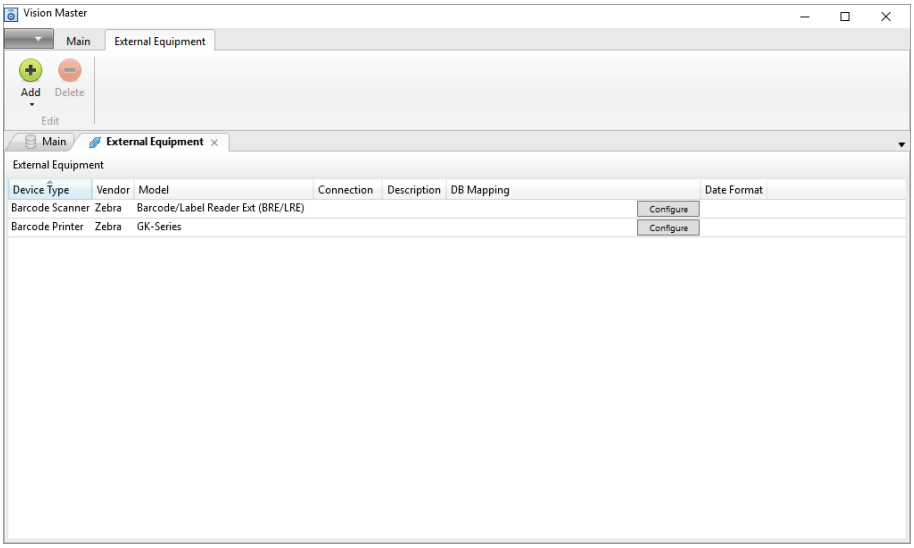


Fig. 147. Connected barcode scanner

For correct work of both devices you must configure the database mapping.
Click the “Configure” button in the printer row.

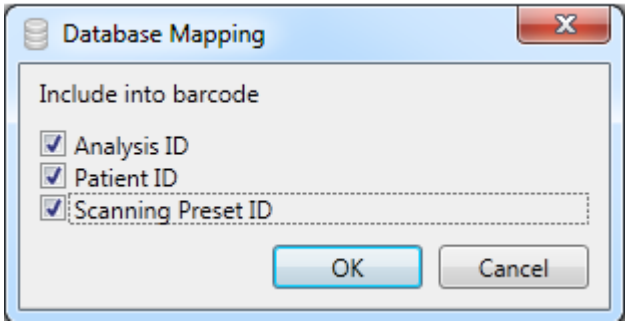


Fig. 148. DB mapping configuration for a barcode printer

Select the parameters that will be included in the barcode. Click “OK” to apply changes, or click “Cancel” to quit without saving.

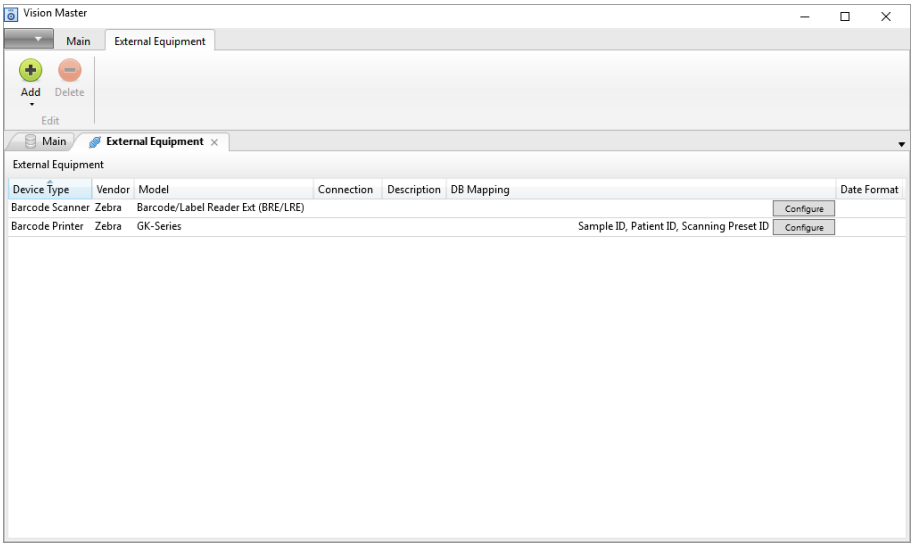


Fig. 149. Printer with a configured DB mapping

Now you need to adjust the scanner. To do so, click the “Configure” button.

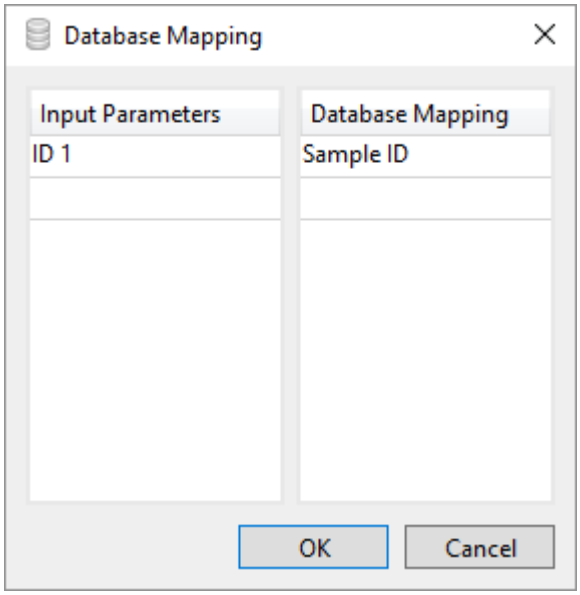


Fig. 150. DB mapping configuration for a barcode scanner

Set the mapping for each of three parameters. Click “OK” to apply changes.

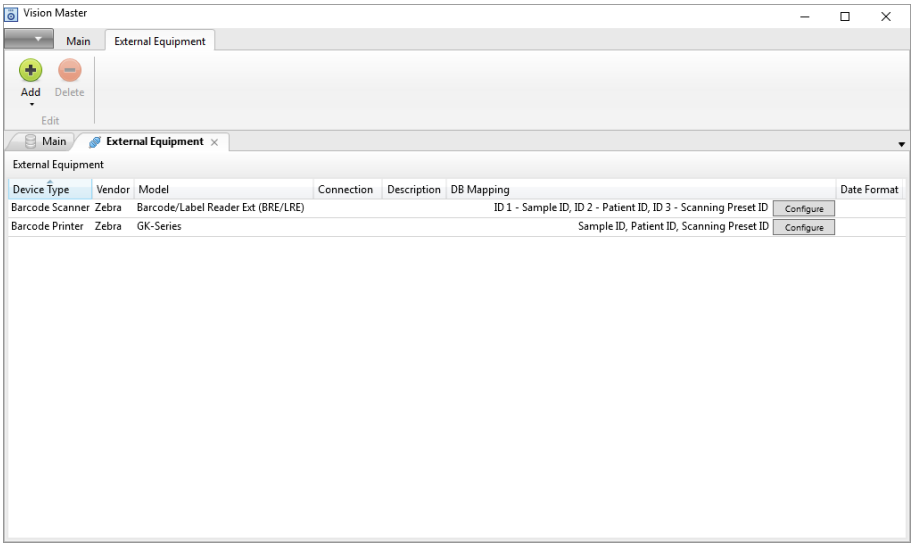


Fig. 151. Configured devices

Now you can start working.

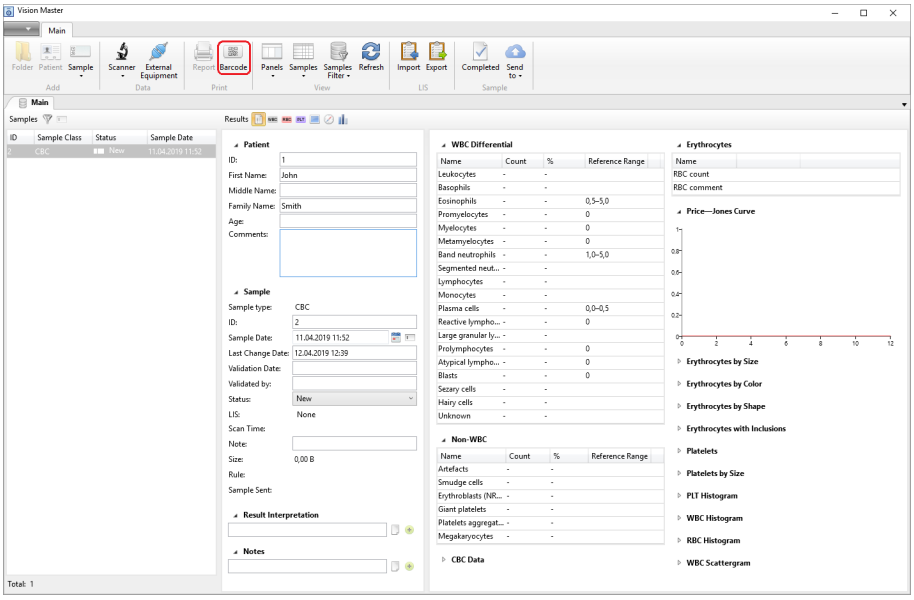


Fig. 152. Creating a barcode for sample

Select the sample you are going to print the barcode for. Click the “Barcode” button on the tools ribbon.

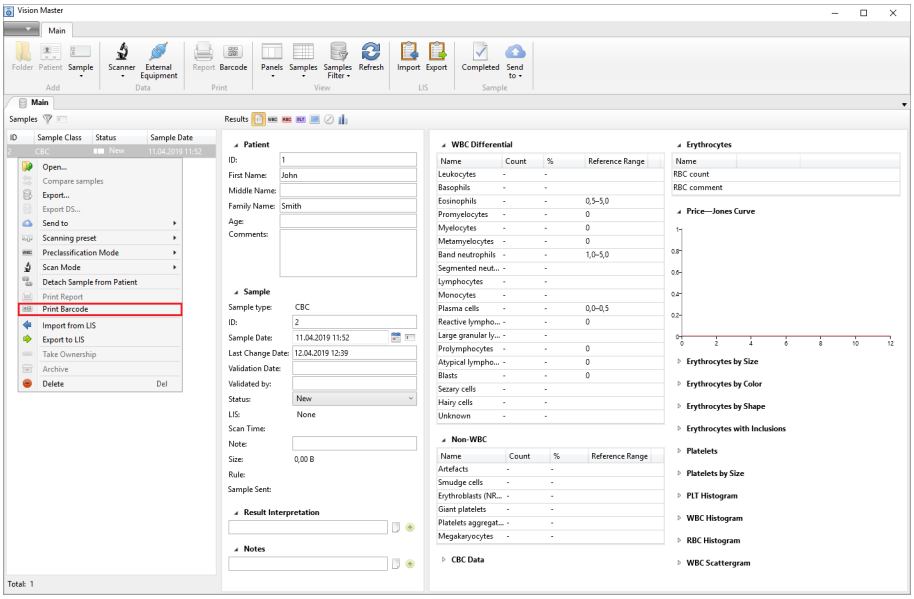


Fig. 153. Printing a barcode from the context menu

You can also print a barcode by right-clicking a sample and selecting the “Print Barcode” option from the context menu.

Stick the printed barcode to a slide.

Attention!

All ID parameters combined should not exceed 40 symbols.

If you have slides with barcodes, you can quickly find the required sample in the database, or quickly create one.

Scan the barcode from the slide. If the patient and the sample IDs from the barcode are already present in the database, this sample will become the first in the analyzer worklist. If

the sample and the patient have not been added to the database yet, they will be added automatically.

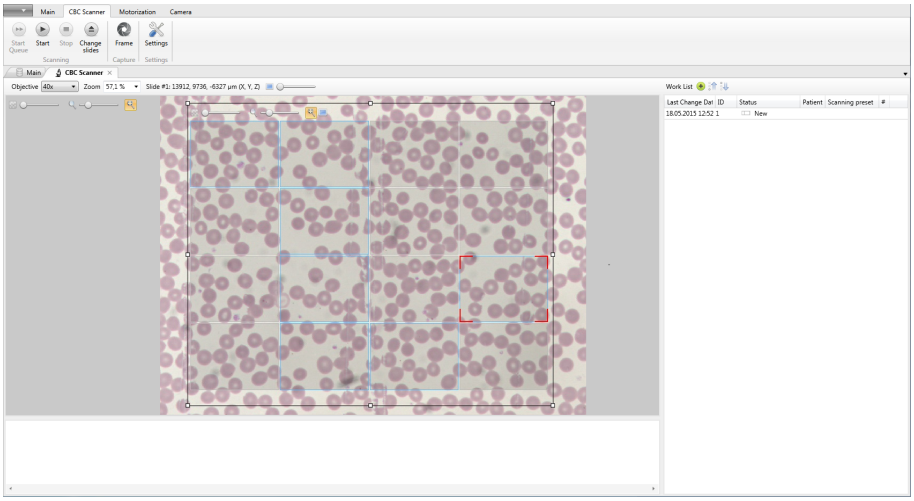


Fig. 154. The recognized sample becomes the first in the queue

You should scan the barcodes of the slides on the stage from right to left.

After the recognized sample is added to the analyzer worklist, you can start scanning (see the section 6.2).

Important!
Mismatch of slides and their labels may lead to a mix-up of analyses and wrong diagnoses to patients.

6.4 Receiving Data from Equipment

6.4.1 Connecting External Equipment

Sometimes you might need to import data received by a device. The first thing you need to do is to set the data transfer from the device to the program.

Check the device connection to the PC and open the “Service” | “External Equipment”.

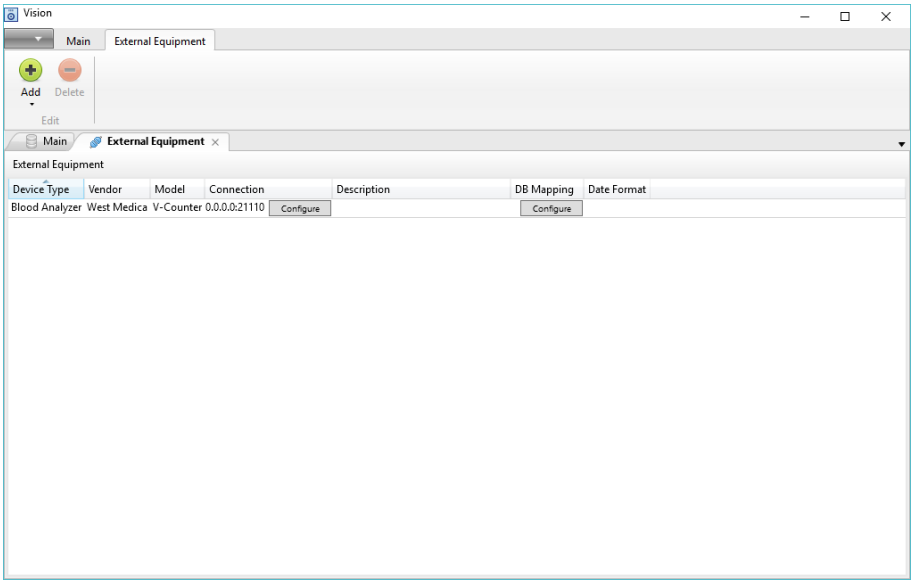


Fig. 155. “External Equipment” window with an added device

1. Click “Add” and select the required device from the drop-down list.

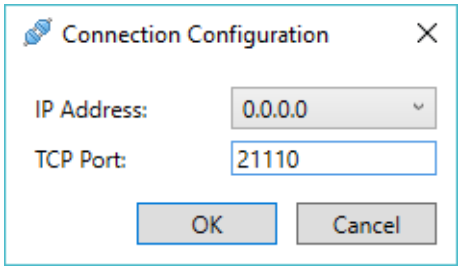


Fig. 156. Connection configuration

2. Set connection settings.

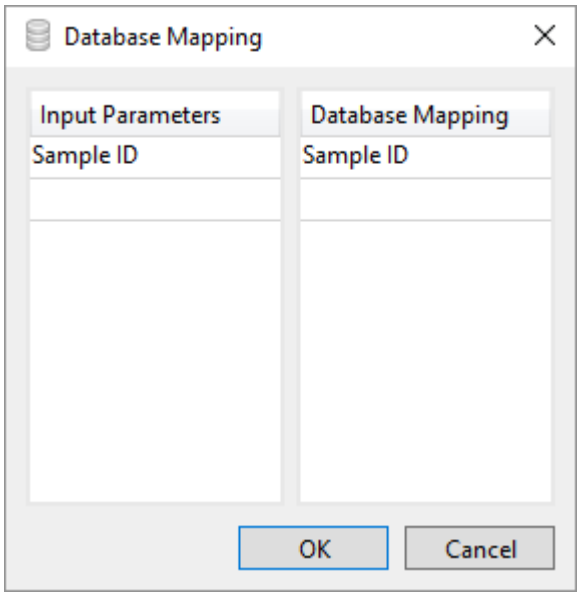


Fig. 157. “Database Mapping” dialogue

3. To set database mapping, click on the “Configure” button. A new window will open.

“Input Parameters” are a patient ID or a sample ID from the device; “DB mapping” is the ID in the Vision database

4. When a sample is imported from the device, the patient ID will correspond to the same sample ID existing in the program DB. If there is no sample with such ID, a new sample will be created.

6.4.2 Sending Data

1. Turn on the analyzer and wait for the main menu to be displayed.

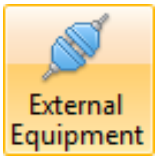


Fig. 158. Vision ready to work with received data

After the device options show up, switch on the device connection in Vision by clicking “Scanner” on the “Main” control ribbon. Select and send samples in the device menu.

After sending the data from the analyzer, wait for it to appear in the list of samples.

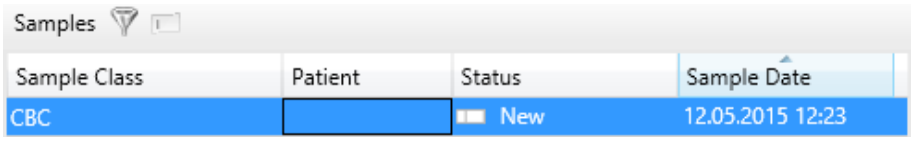


Fig. 159. Imported sample

6.5 Communicating with the LIS

LIS communication provides the following features:

- Analyses management from the LIS;
- Data update: sample results for the LIS and patients for Vision.

Communication with the LIS may be set with unidirectional or bidirectional communication depending on the used LIS.

6.5.1 Unidirectional Communication

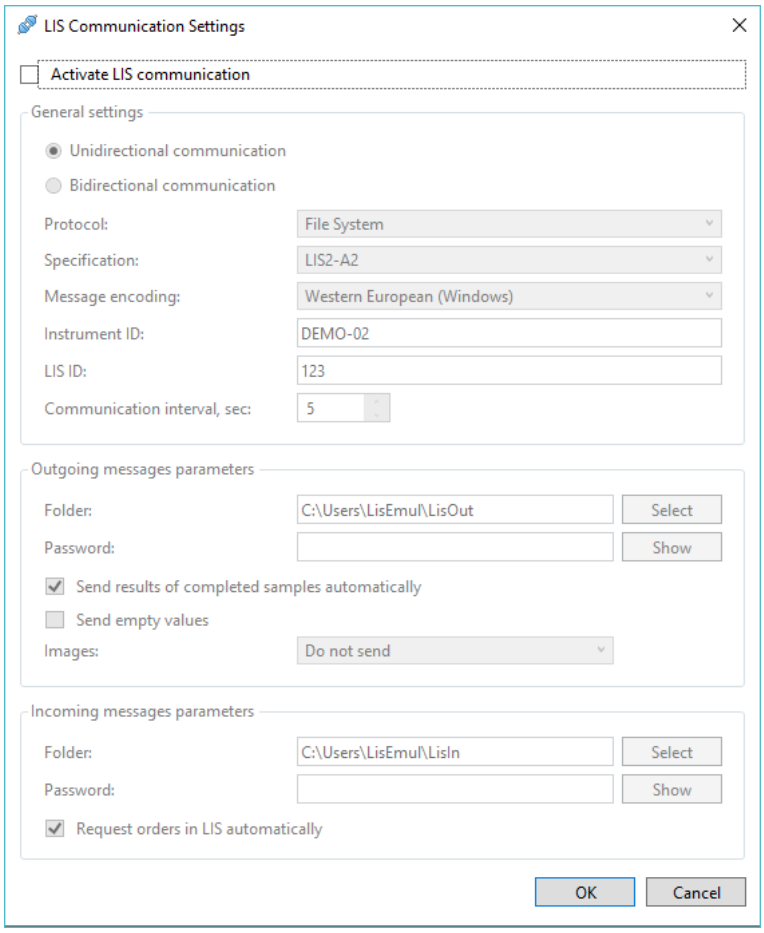


Fig. 160. LIS communication settings

1. Check the “Activate LIS communication” box to access the LIS communication settings.

Set the needed options:

- Select “Unidirectional communication”;
- Select “File System” protocol;
- “Specification” — change the specification if necessary;
- “Message encoding” — the type must be the same for Vision and LIS;
- “Instrument ID” — enter the unit ID with the installed Vision. By default the ID is your PC name;
- “LIS ID” — enter the LIS ID. To get this information please address your IT administrator;
- “Outgoing messages parameters” — choose a folder for outgoing data for LIS. When using HL7, select the specification version. Set password if needed. For automatic update of analyses results, check “Send results of completed samples automatically”. If necessary, check “Send empty values” to send codes of empty fields and define the action with images in the “Images” drop-down list.

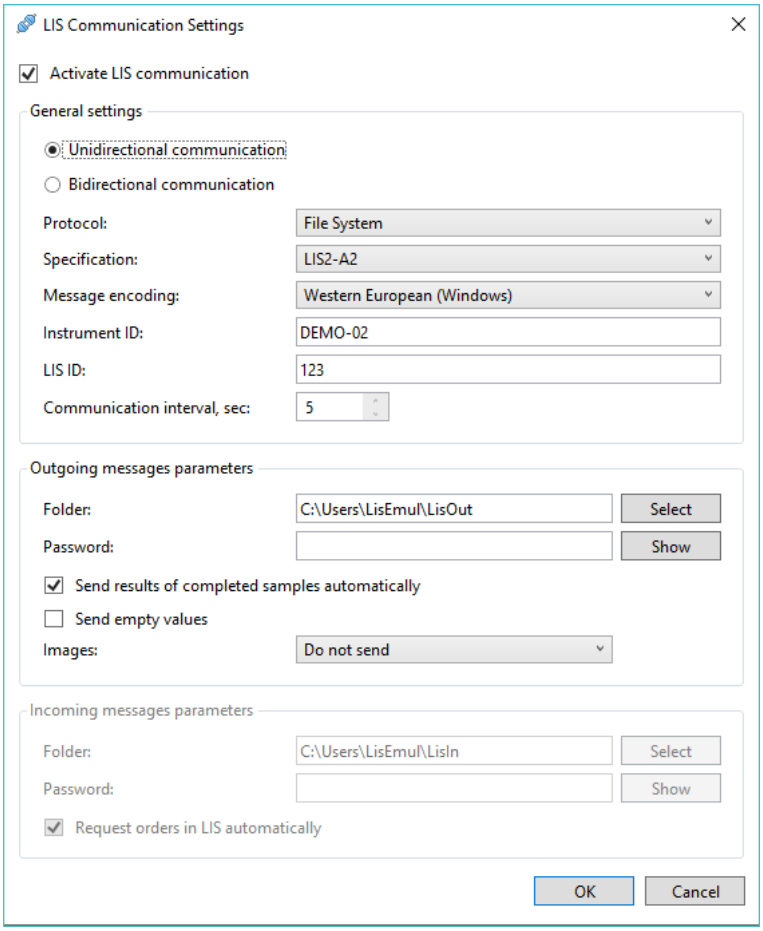


Fig. 161. LIS communication settings for unidirectional communication

Click the “OK” button to apply the changes and activate communication.

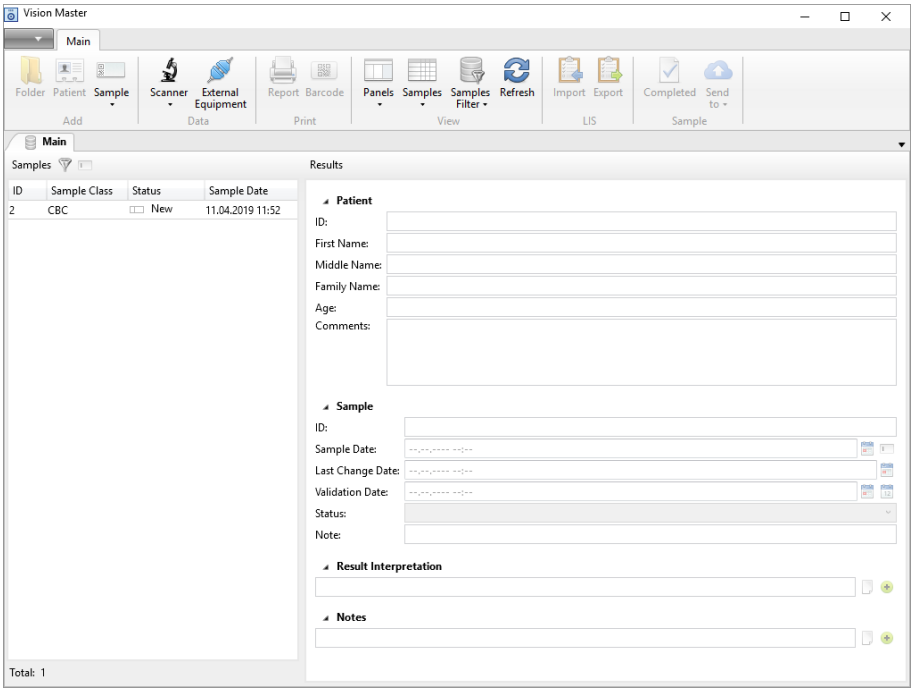


Fig. 162. Main window

2. Add a sample and if needed attach it to a patient. Perform the needed scanning, described in section 3.3, 3.4 and 3.5.

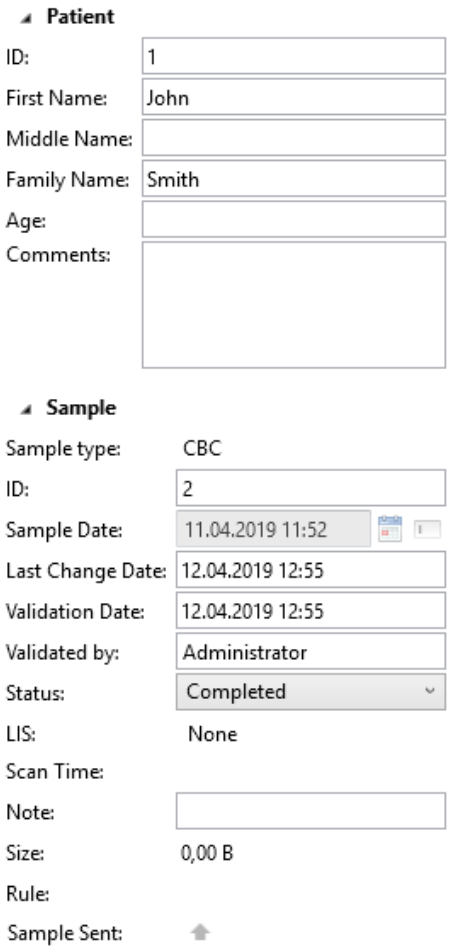


Fig. 163. Sample attributes after setting communication with LIS

3. After completing your work with samples, choose the required samples and click the “Export” button on the main ribbon or choose “Export to LIS” in the context menu.

Automatic update is performed once the sample status is changed to “Completed”.

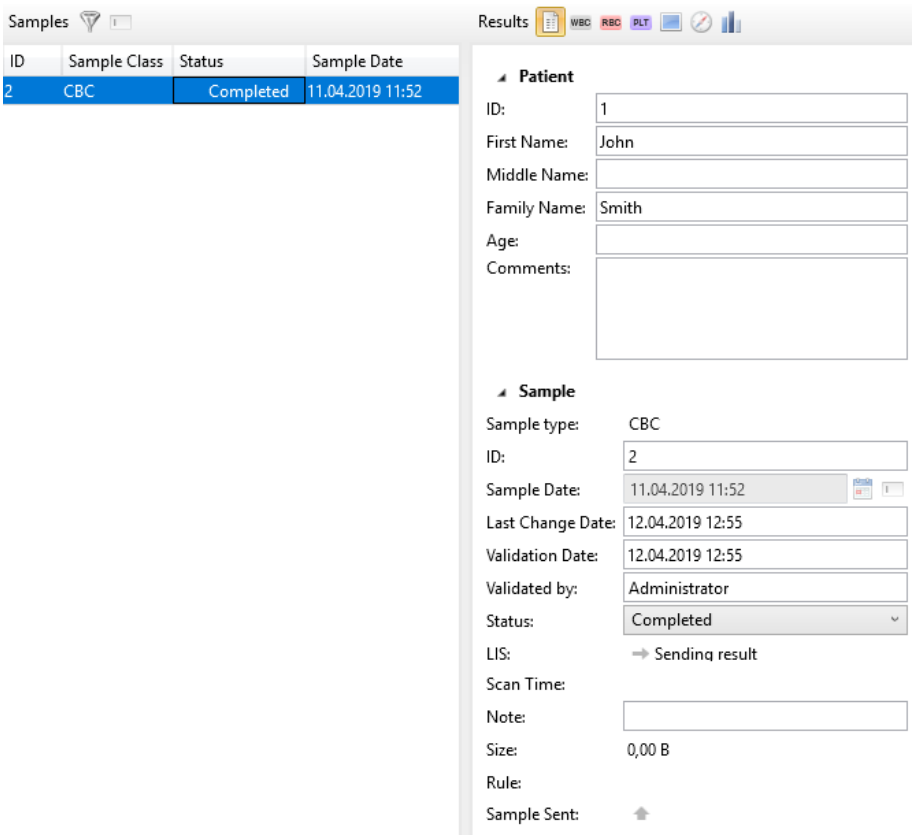


Fig. 164. Data exporting process

While data is sending the LIS status will change to → "Sending result".

When the export will be completed the LIS communication status will change to ✓ "Result sent".

6.5.2 Bidirectional Communication

1. To start work go to “Service” | “LIS communication settings” in the main menu.

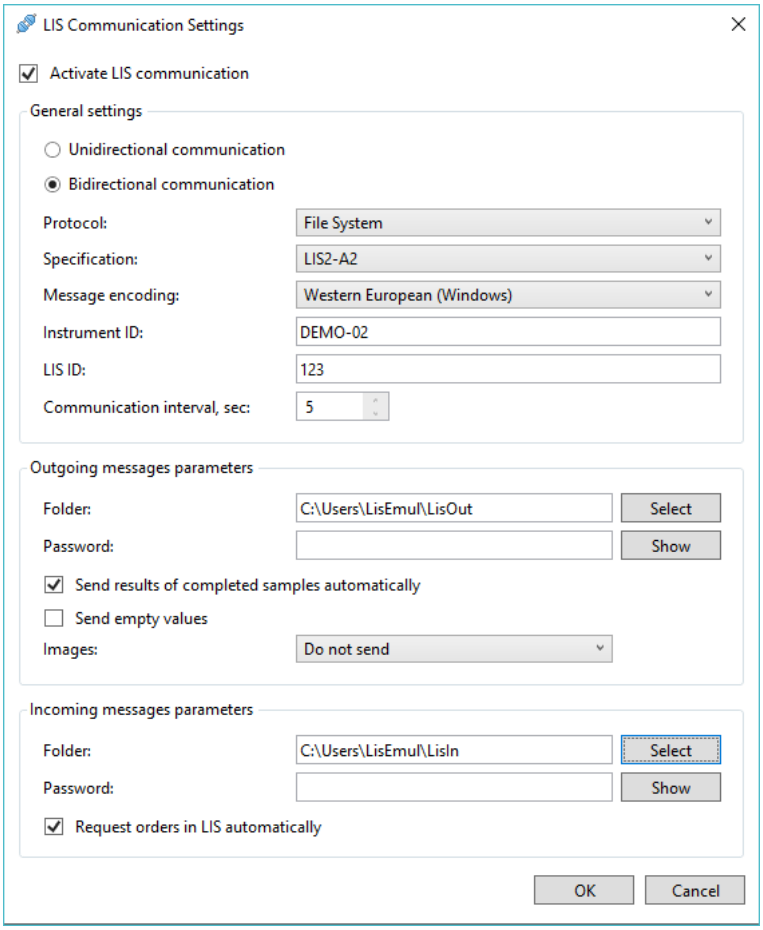


Fig. 165. LIS communication settings

2. Check the “Activate LIS communication” box to access the LIS communication settings.

Set the needed options:

- Check “Bidirectional communication”;
- Choose “File System” protocol;
- “Specification” — change the specification if necessary;
- “Message encoding”— the type must be the same for Vision and the LIS;
- “Instrument ID” — enter the unit ID with the installed Vision. By default the ID is your PC name;
- “LIS ID” — enter the LIS ID. To get this information please address your IT administrator;
- “Outgoing messages parameters” — choose a folder for outgoing data for LIS. When using HL7, select the specification version. Set password if needed. For automatic update analyses result check “Send results of completed samples automatically”. If necessary, check “Send empty values” to send codes of empty fields and define the action with images in the “Images” drop-down list;
- “Incoming messages parameters” — only for bidirectional communication. Choose a folder for incoming data for Vision. Set password if needed. For automatic sending of orders, check “Request orders in LIS automatically”.
- Click “OK” to apply changes and activate communication.

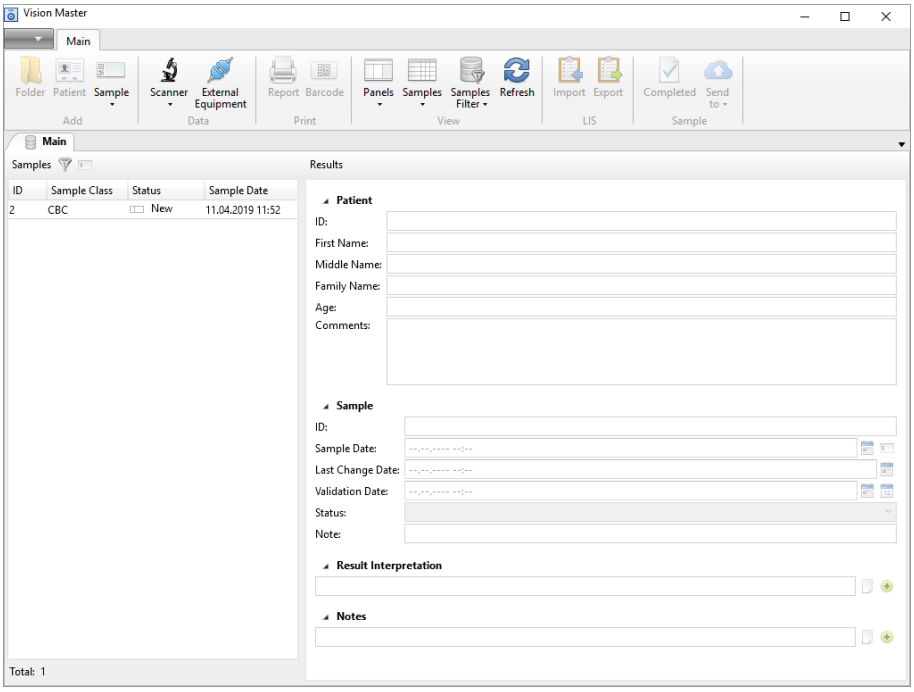


Fig. 166. Main Window with active bidirectional LIS communication

3. Wait until the import from the LIS to the Vision is complete.

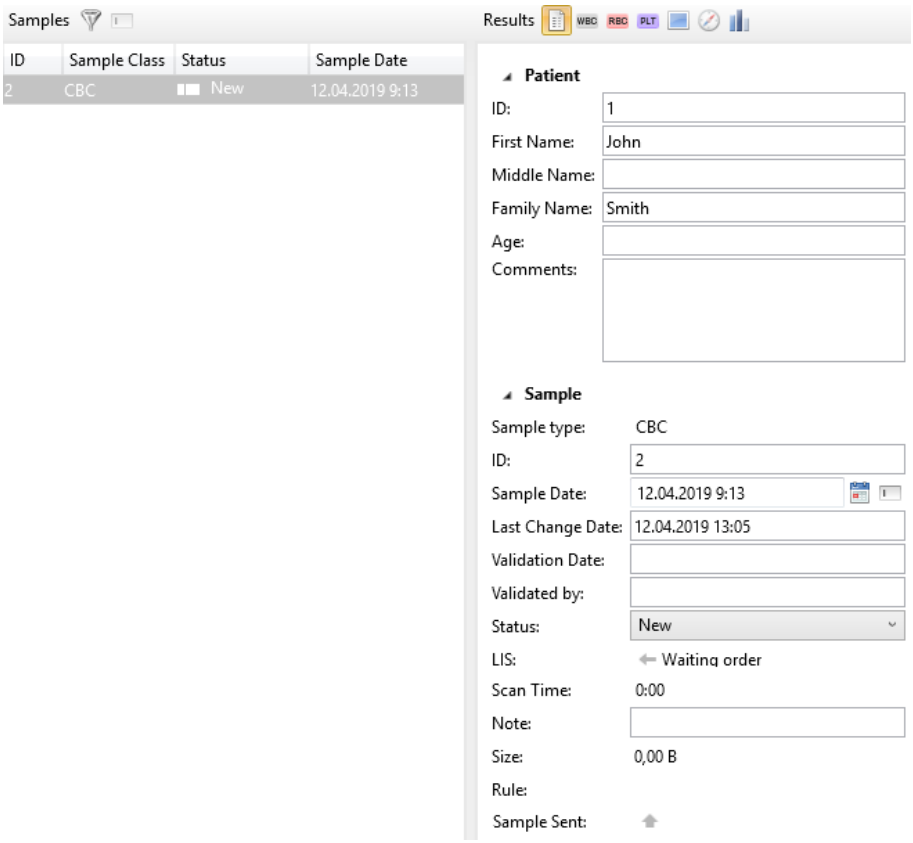


Fig. 167. Waiting order

4. If you need to update patient data or analyses attributes (Sample Date, etc.), request data update from the LIS. To do this, choose samples and click “Import” on the main ribbon or “Import from LIS” in the context menu.

The LIS communication status will change to “Waiting order”.

Receive the data and click the “Refresh” button to update the displayed information in Vision.

The LIS communication status will change to “Linked”.

You can cancel the sample scanning from LIS, then after an update the sample status will change to “Delayed”.

5. After work with the sample, choose the sample and click the “Export” button on the main ribbon or choose “Export to LIS” in the context menu to send data to LIS.

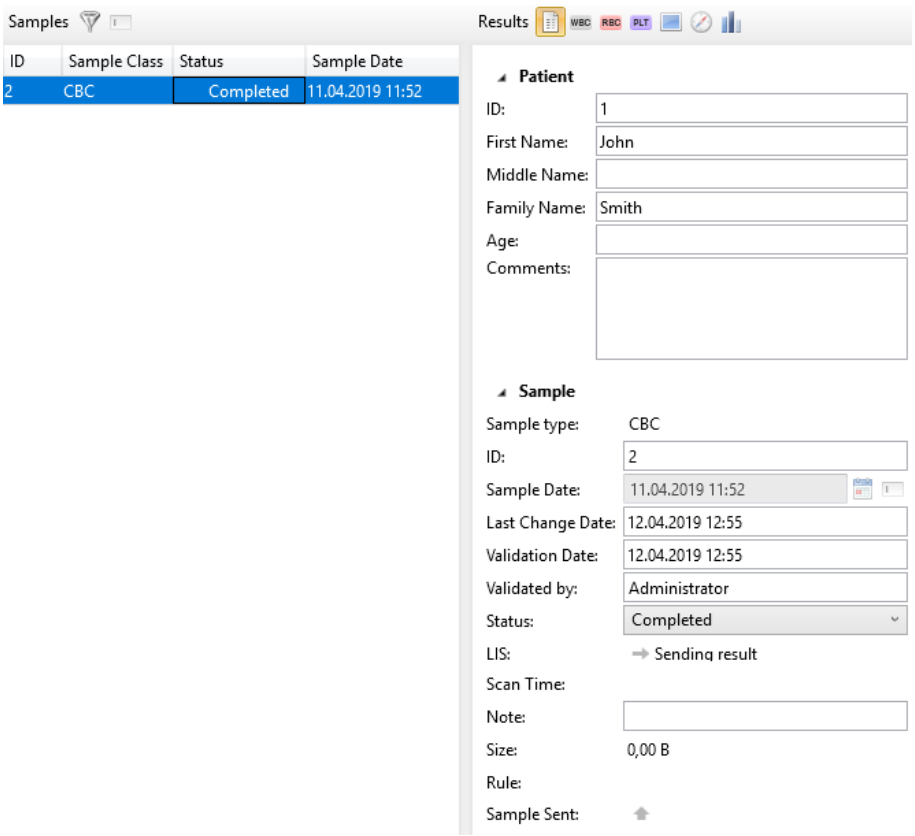


Fig. 168. Export of data to the LIS

During the process of exporting data in LIS, the LIS status changes to → “Sending result”.

Once the export is finished the LIS communication status will change to ✓ “Result sent”.

6.5.3 Connection via TCP/IP Protocol

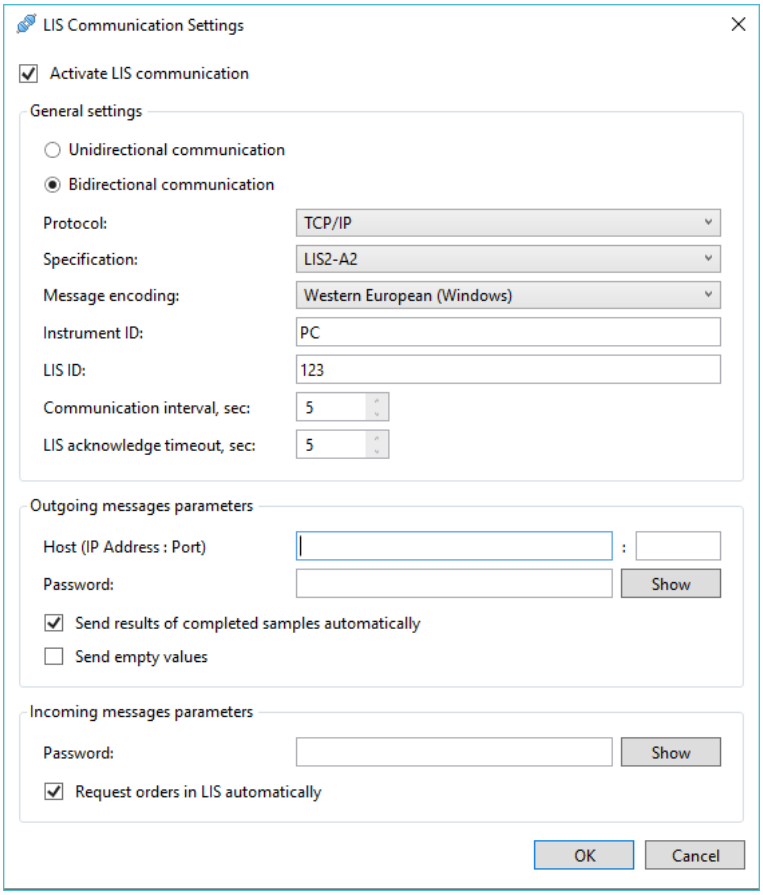


Fig. 169. LIS communication settings

1. Check the “Activate LIS communication” box to access the general settings of communication parameters.

Set the necessary parameters:

- When connecting via TCP/IP protocol, the connection may be either unidirectional or bidirectional. Select one depending on the type of your analyzer;
- Select the “TCP/IP” protocol;
- “Specification” — change the specification if necessary;
- “Message encoding” — encodings of messages in Vision and in the LIS should match;
- “Instrument ID” — enter the name of the unit with the installed Vision. By default, the name of your PC is indicated in this field;
- “LIS ID” — enter the ID of the LIS you want to connect to. Contact the IT administrator to get this information;
- “LIS acknowledgement timeout, sec” — if your Internet connection is slow you may need to increase the LIS timeout;
- “Outgoing messages parameters” — enter the IP address and the port of the server with the installed LIS. You can obtain this information from a IT administrator. Set a password for information protection. When using HL7, select the specification version. Check the “Send results of completed samples automatically” box to automatically send the results of samples examination;
- “Incoming messages parameters” — only for bidirectional connection. Set a password for information protection. Check the “Request orders in LIS automatically” box to send requests for updates of data.

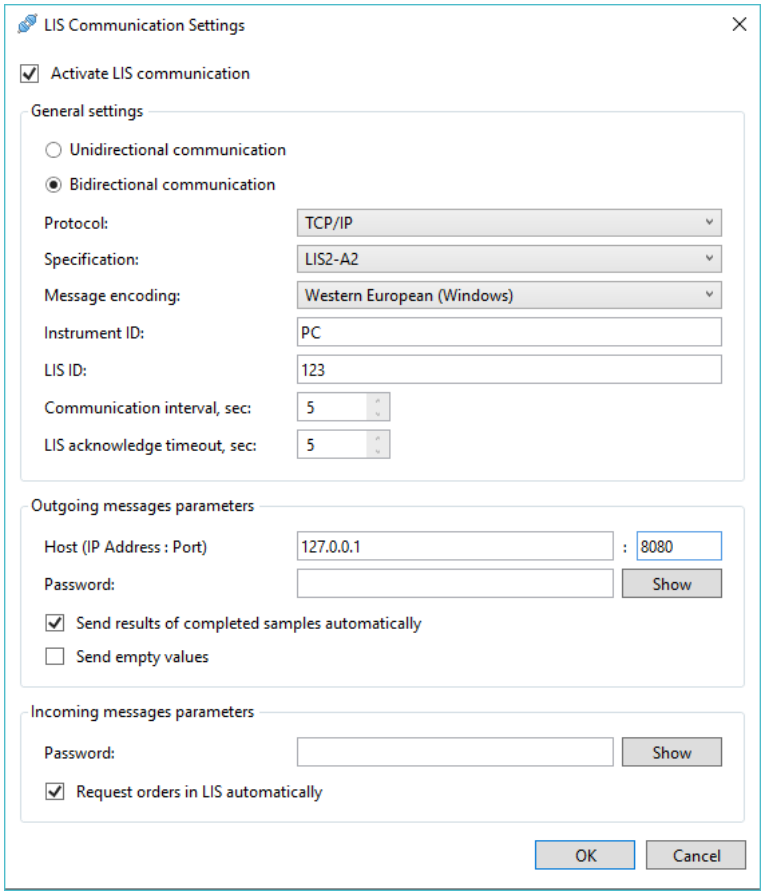


Fig. 170. Completed LIS communication settings

Click “OK” to establish connection.

After setting up the communication via TCP/IP protocol, the work with the LIS is conducted as usual.

7 Vision Software Installation

7.1 Package Contents

The installation kit includes a disk with a distribution package that will install the components needed for correct work of Vision software, and user manuals.

The disk includes the following files:

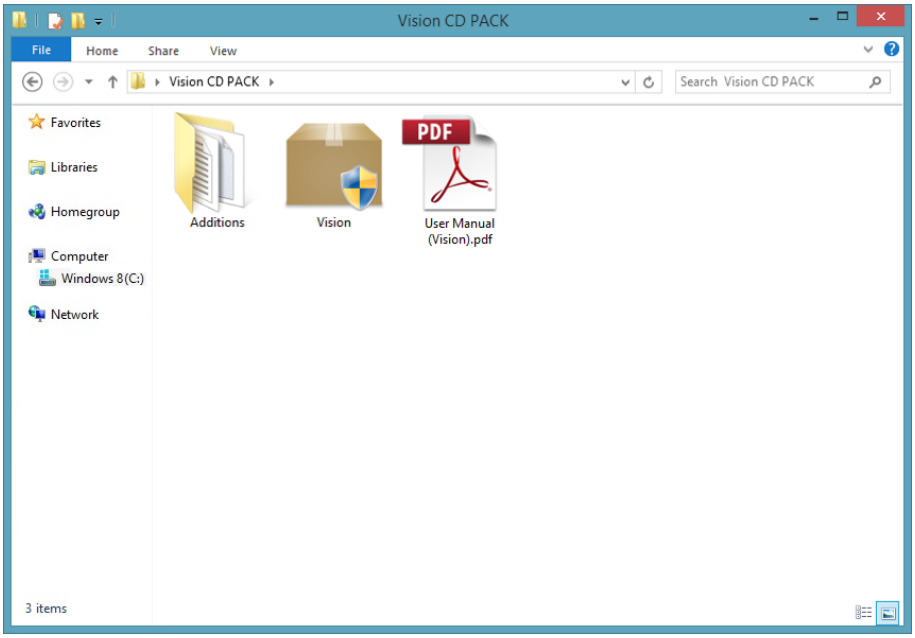


Fig. 171. Contents of the installation disk

- "Additions" folder contains additional installation packages for Vision installation:
  - Adobe Reader — installation package required to read instructions in PDF format;
  - MS SQL — installation package for MS SQL database;
- Vision — Vision installation package;
- Vision user manual — the name of the file may be different depending on the package.

7.2 Vision Installation Process

7.2.1 Installing Vision Software

Run the Vision.exe file form the installation disk.

If you have a previous version of the application installed on your computer, you will be offered to uninstall it and continue the installation.

Wait until all required files are extracted.

Attention!

After updating Vision 1.12 to later versions, it is necessary to:

1. Manually correct the C:\Users\{UserName}\Vision Documents\ServiceApplicationSettings\settings.xml file, remaining from the previous version: change all "MedicaProductSettings" instances to "Settings" (otherwise the {UserName} user won't be able to launch Vision applications).

2. Remove the C:\Windows\System32\config\systemprofile\Vision Documents\ServiceApplicationSettings\settings.xml file, remaining from the previous version (otherwise LIS communication will be impossible).

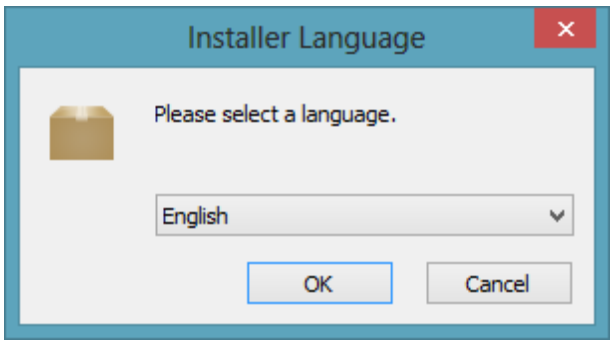


Fig. 172. Application language selection

Select a language for the application.

If the program discovers that some updates required for correct work of the application are not installed, it will suggest installing them. If the required software is already installed the corresponding steps will be skipped by the installer.

7.2.2 Installing Required Components

If the required components are already installed in the system, the installer will skip to installing Vision software. The installation of the components may take a while depending on your computer performance.

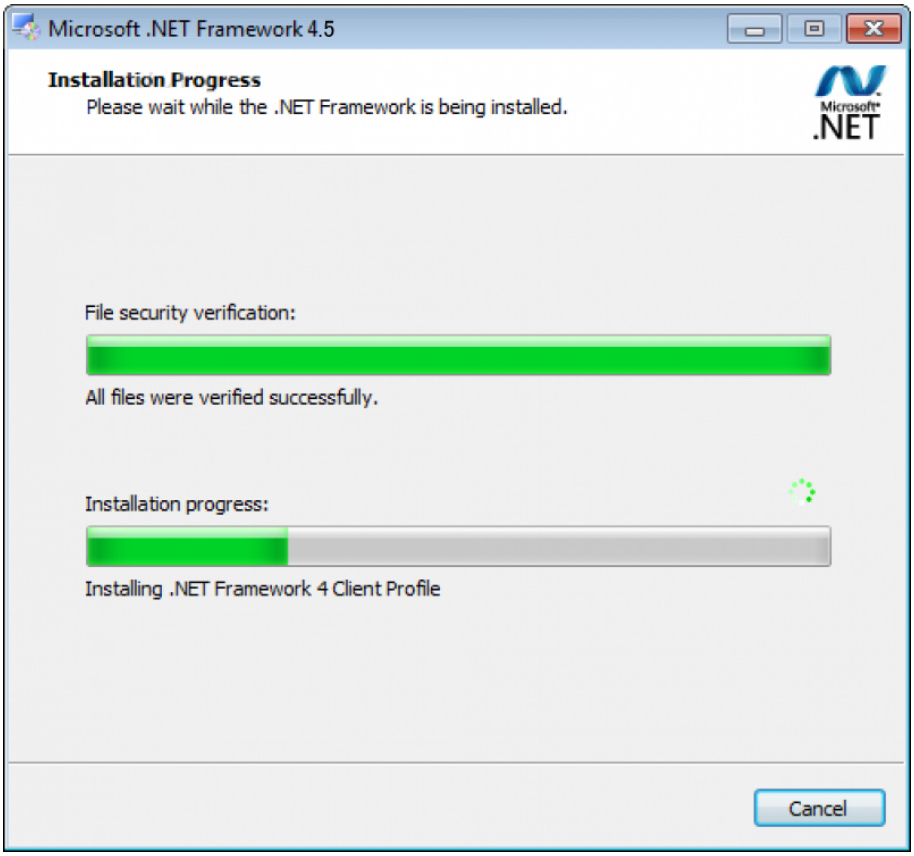


Fig. 173. Installing Microsoft .NET Framework 4.5

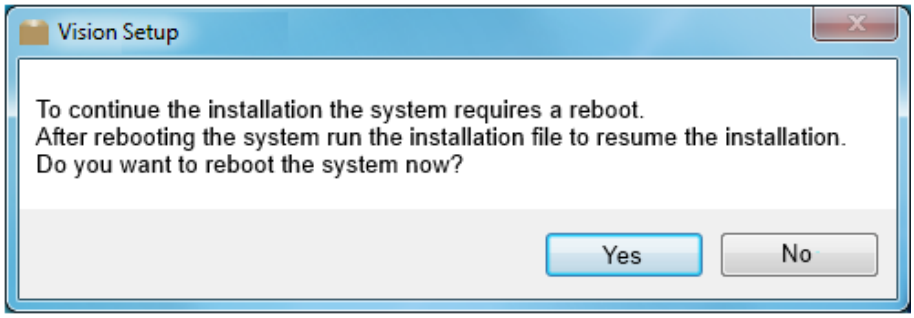


Fig. 174. Reboot dialogue

Once Microsoft Net Framework 4.5 is installed, the system will require a reboot. Click the “Yes” button to reboot the computer or you can reboot it later. After the computer is rebooted, run the installation file again.

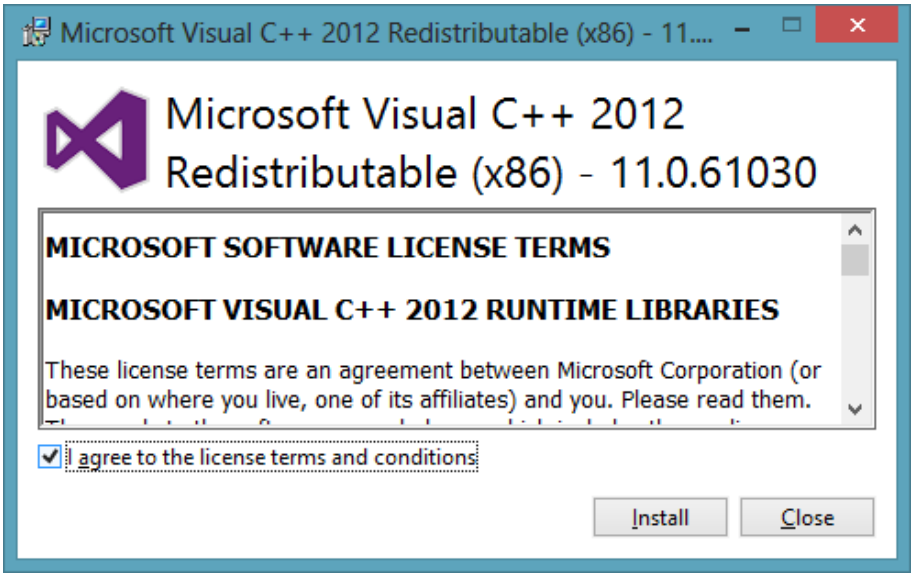


Fig. 175. Microsoft license agreement

Accept the license agreement by checking the “I agree to license terms and conditions” checkbox. Click the “Install” button.

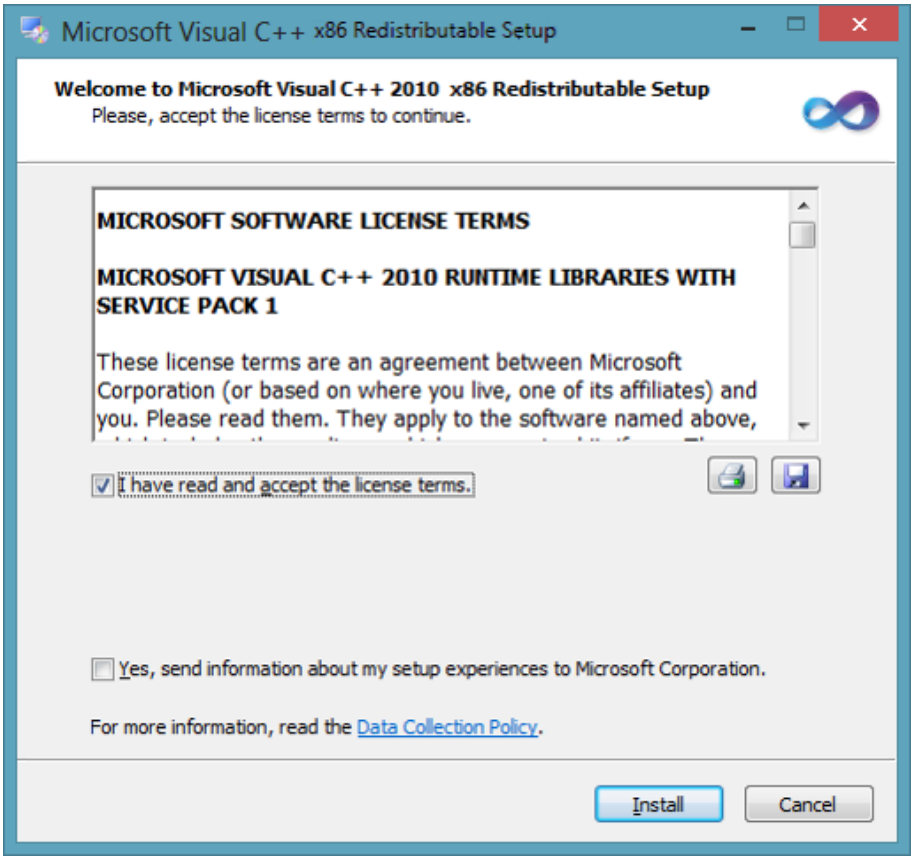


Fig. 176. Microsoft license terms

Accept the license agreement by checking the “I have read and accept the license terms” checkbox. Click the “Install” button.

Click “Finish” to pass on to the next step.

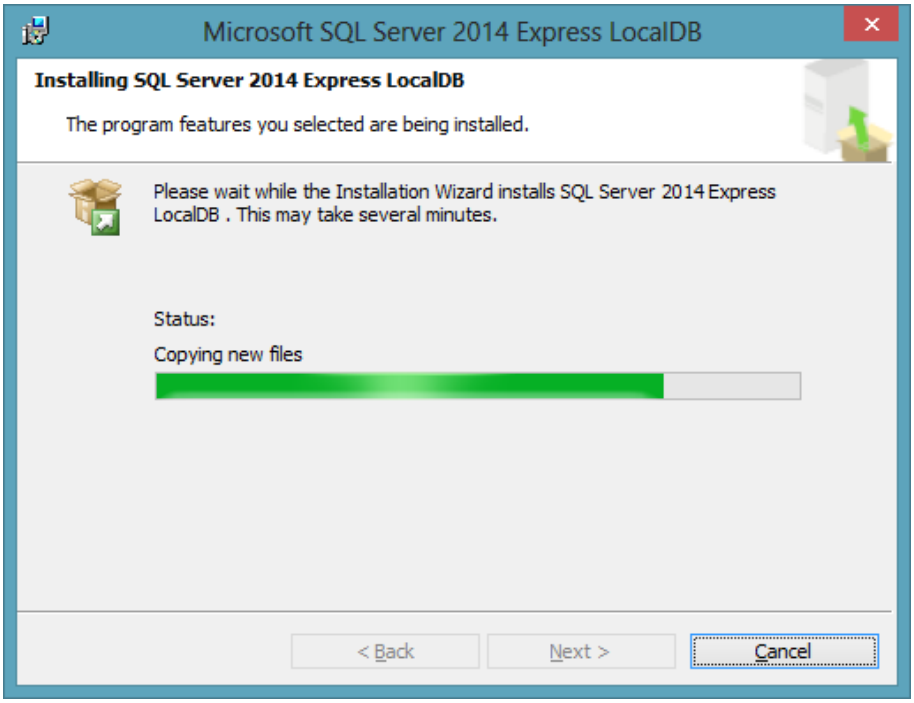


Fig. 177. Installing SQL Local Server

Installing Microsoft SQL Server 2014 Express LocalDB.

7.2.3 Installing Vision

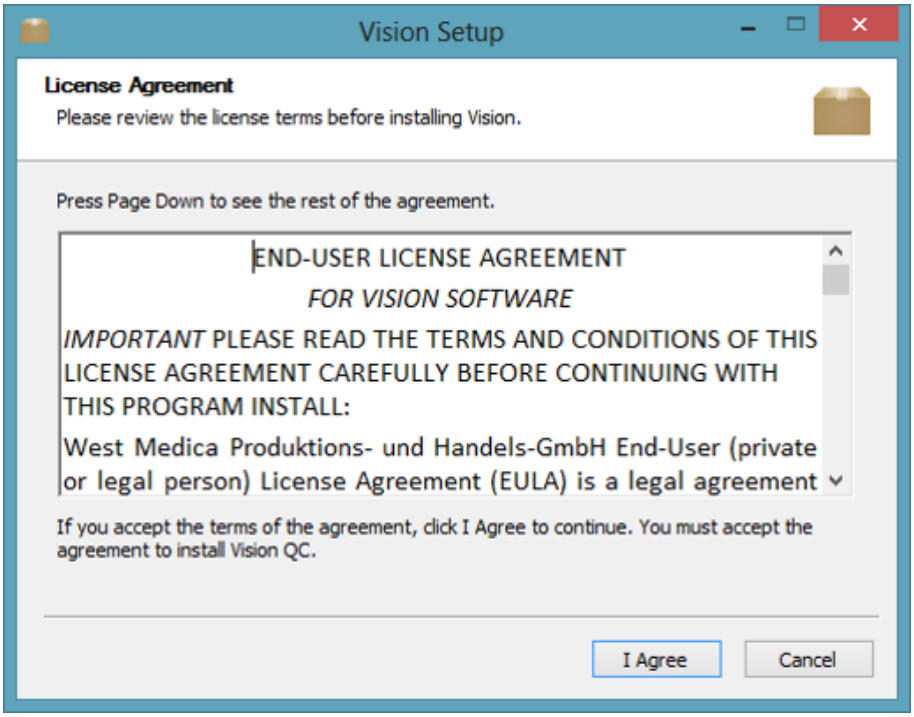


Fig. 178. License agreement

In the “License agreement” window accept the terms of the license agreement by selecting the “I agree” option.

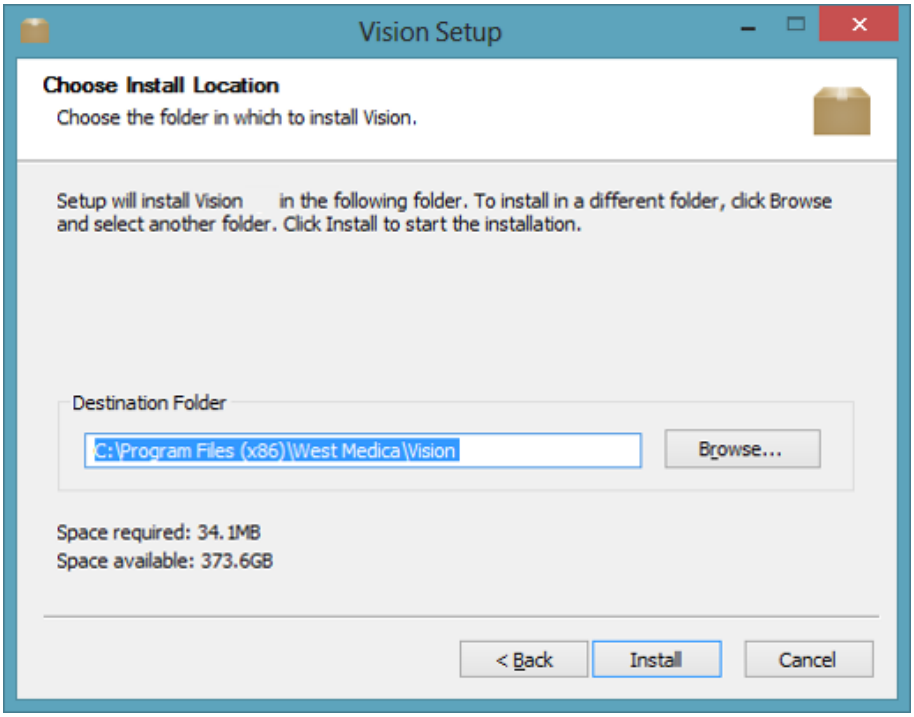


Fig. 179. Selection of the software installation folder

Select the program installation folder in the “Destination Folder” field of the displayed window (you can change it by clicking the “Browse…” button).

Click the “Install” button to start the installation process.

Fig. 180. Windows security window

Confirm the installation of the software in the Windows security messages by clicking the “Install” button.

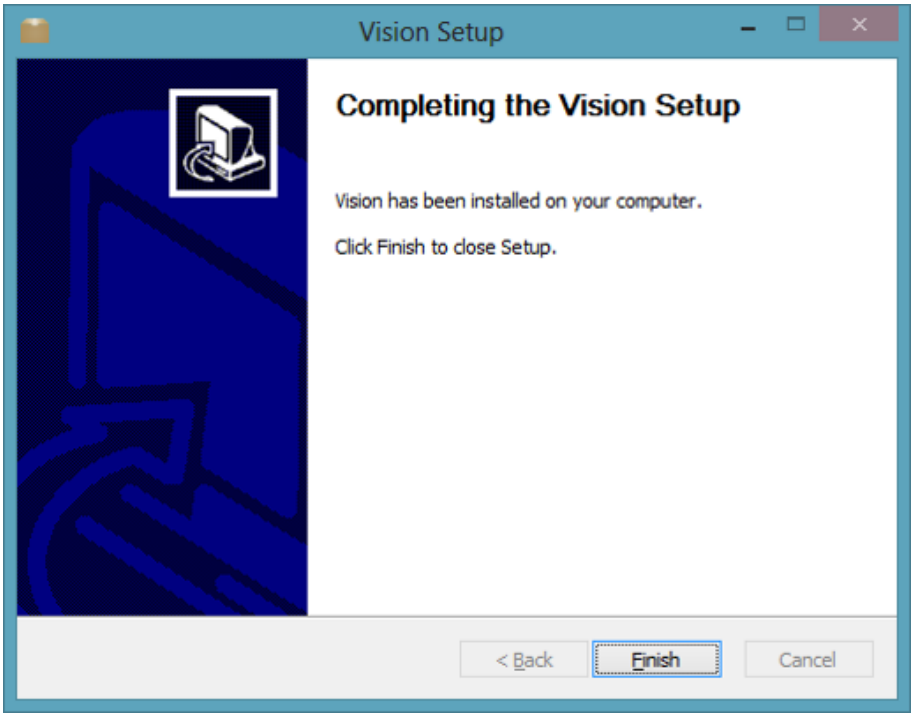


Fig. 181. Vision has been successfully installed

Finish the installation process by clicking the “Finish” button.

7.3 Installing USB Virtual Com Port Driver

Fig. 182. Device Drivers welcome window

Click “Next” to continue.

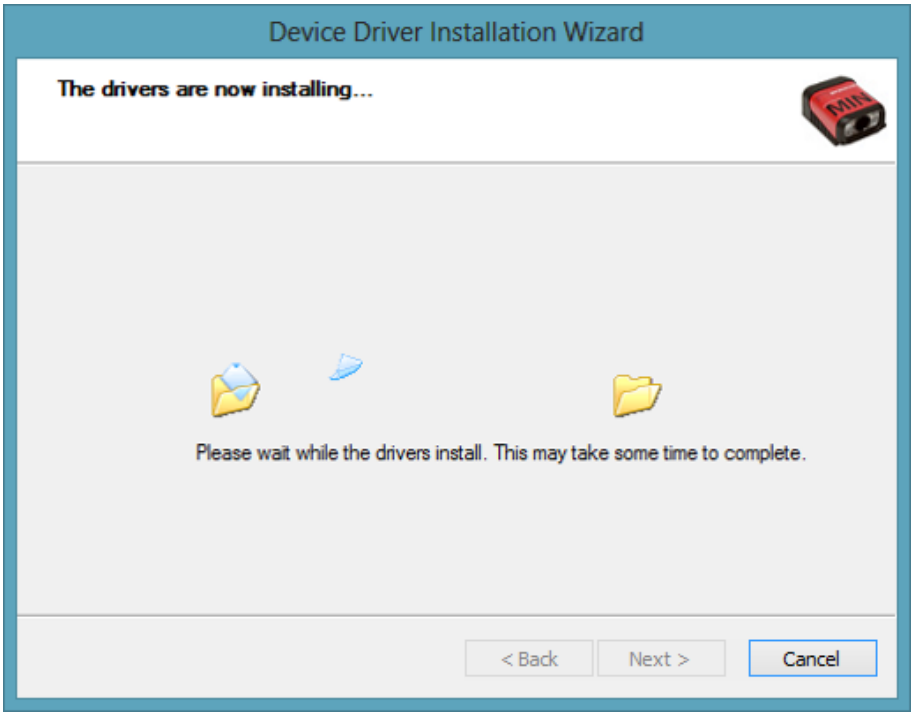


Fig. 183. Driver installation

Wait until the driver is installed.

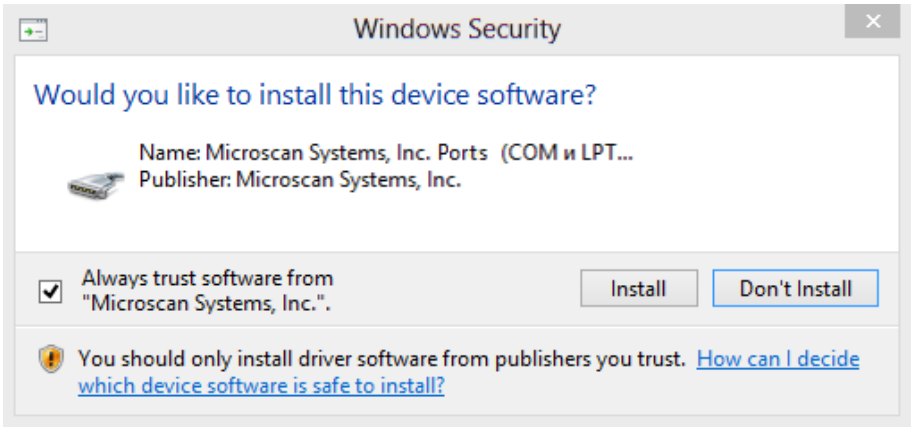


Fig. 184. Windows security

Click “Install” to continue.

Fig. 185. Installation complete

Click “Finish”.

7.4 Starting Vision

The software icon will appear on the desktop after the installation. When the application is started for the first time, the system will need some time to create a database; please wait for the Vision window to appear. By default the program will create a LocalDB database that will be stored on your computer.

7.5 Uninstalling Vision

To uninstall Vision, press Start → Control Panel → Programs and components → Uninstall or change a program (for Windows 7).

Select the program you want to delete. Right-click on it and select “Uninstall” in the context menu.

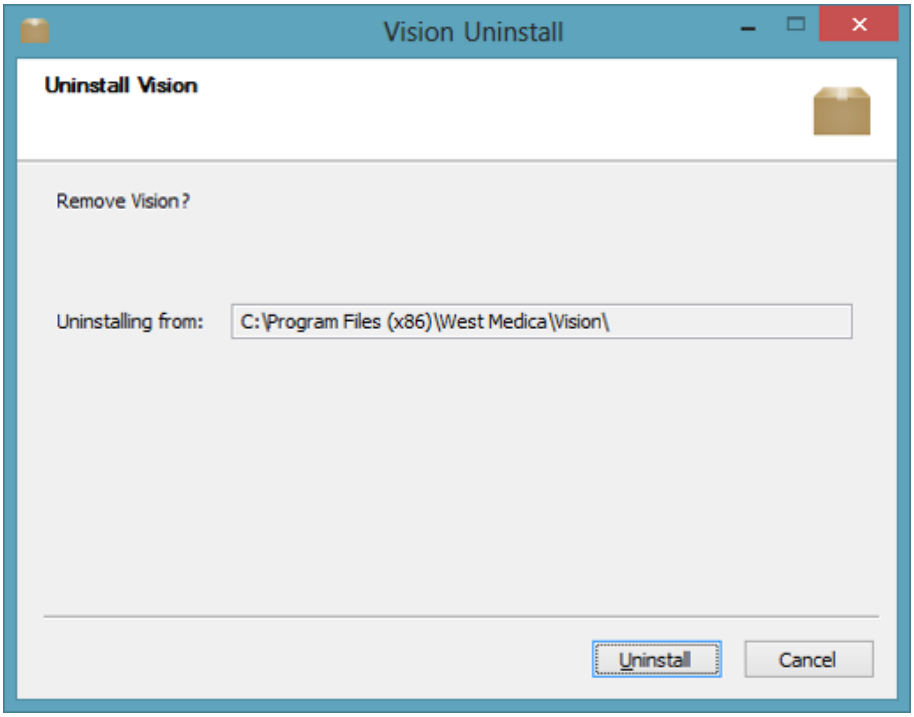


Fig. 186. Deleting confirmation

Confirm your choice by clicking the “Uninstall” button.

You can also delete the program by running the installation file from the disk.

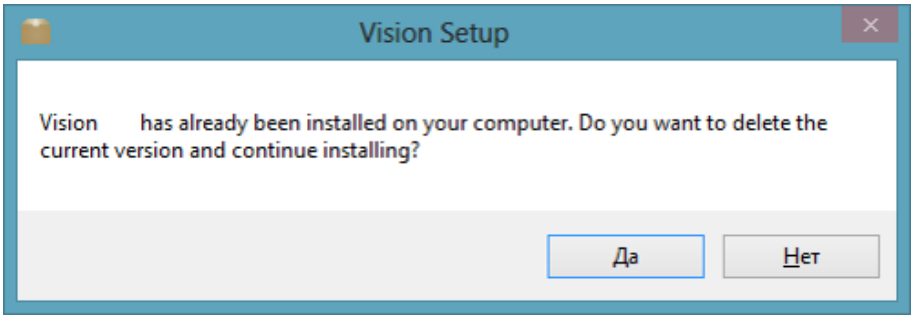


Fig. 187. Deleting the installed version

Click “Yes” to delete the installed version and continue the installation, or click “No” to cancel.

8 Remote Dongle Update

Fig. 188. Application icon

Insert the dongle in a USB-port.

Attention!
Only one dongle must be in USB port now.

Run the “Vision Dongle Update” application stored in the following folder C:\Program Files\West Medica\Vision\RemoteUpdate (Start → All Programs → West Medica → Vision Dongle Update).

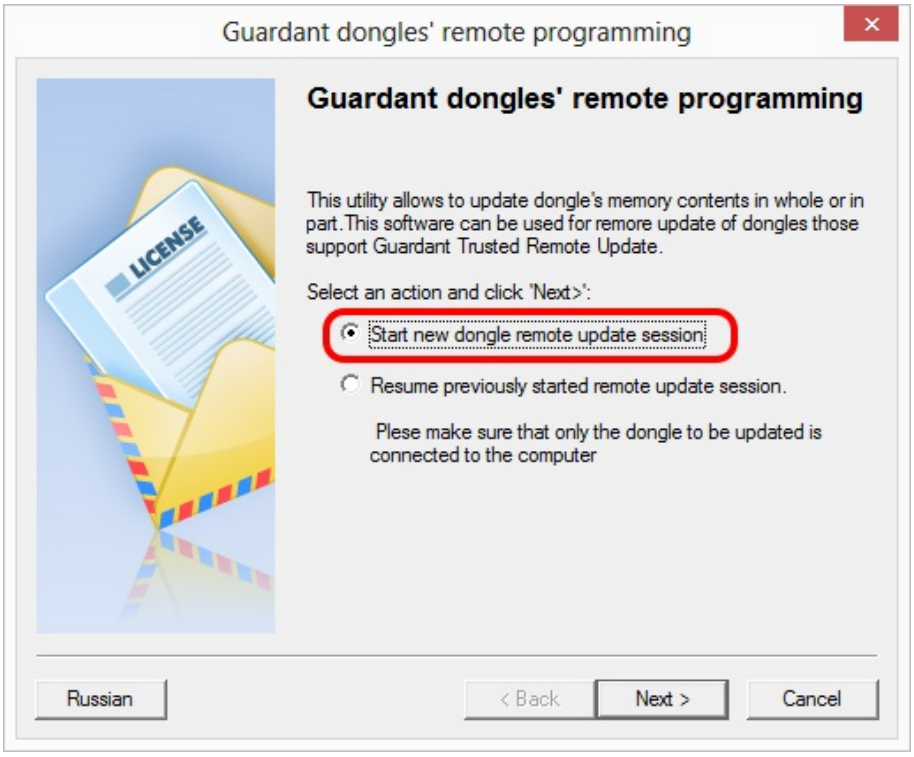


Fig. 189. Starting a new dongle remote update session

Select “Start new dongle remote update session” and click “Next”.

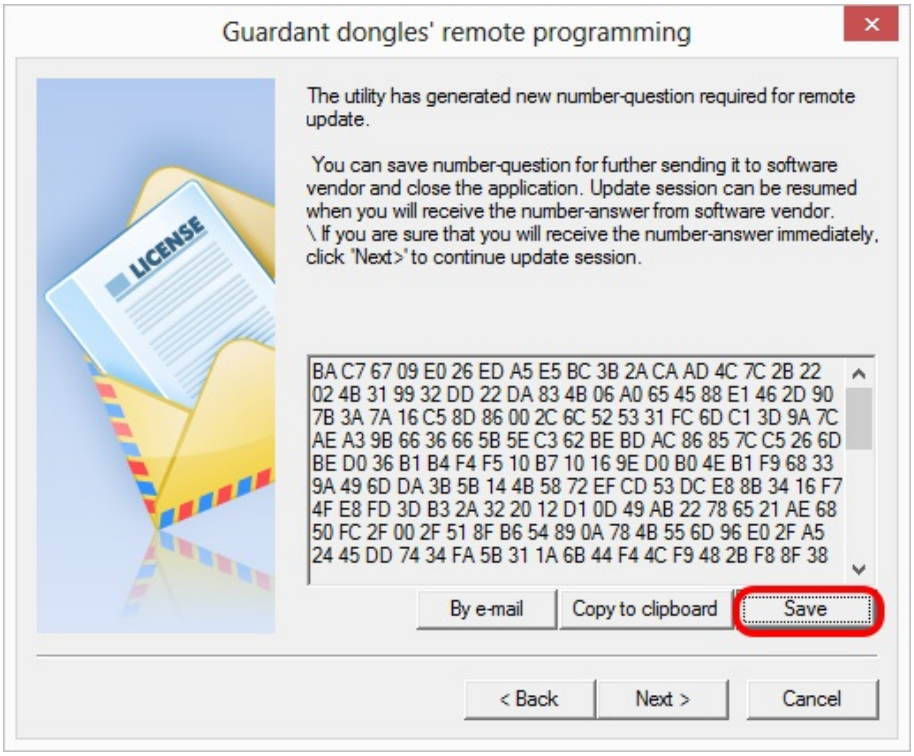


Fig. 190. Dongle update

Click the “Save” button.

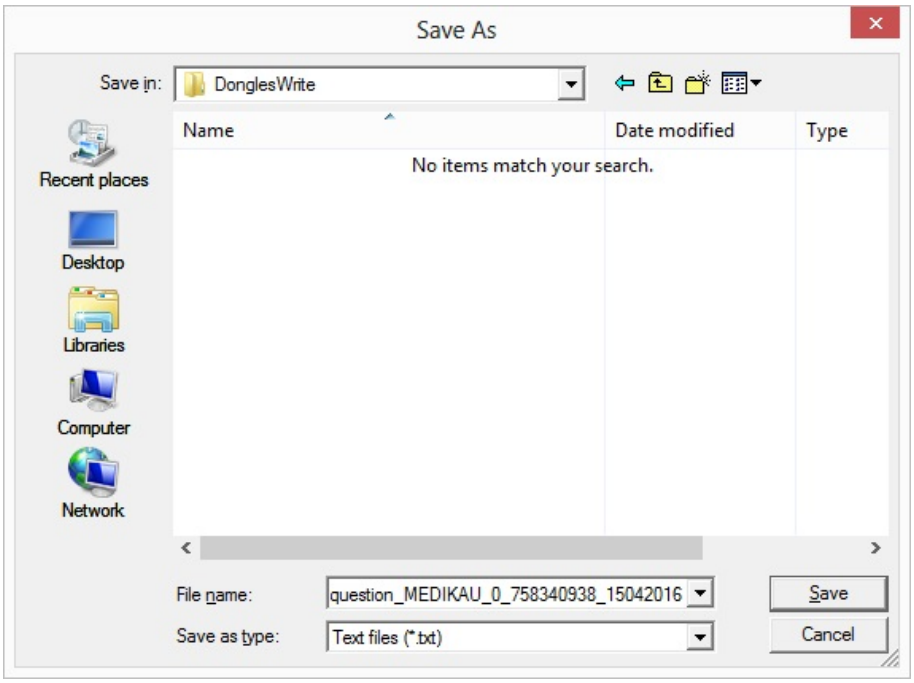


Fig. 191. Choosing folder for the file

Choose the location where the file will be saved and save it. Close the window. Send the file to the distributor. Wait until the distributor sends you another file.

Run the Vision Dongle Update application.

Attention!
Only one dongle should be connected to the PC.

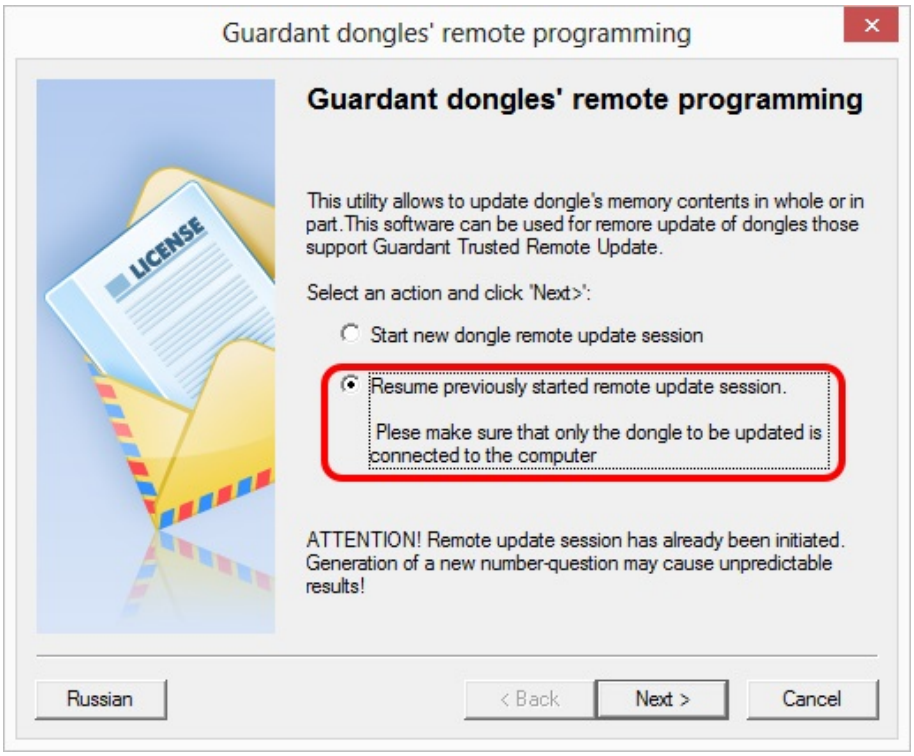


Fig. 192. Remote programming

Select “Resume previously started remote update session” and click “Next”

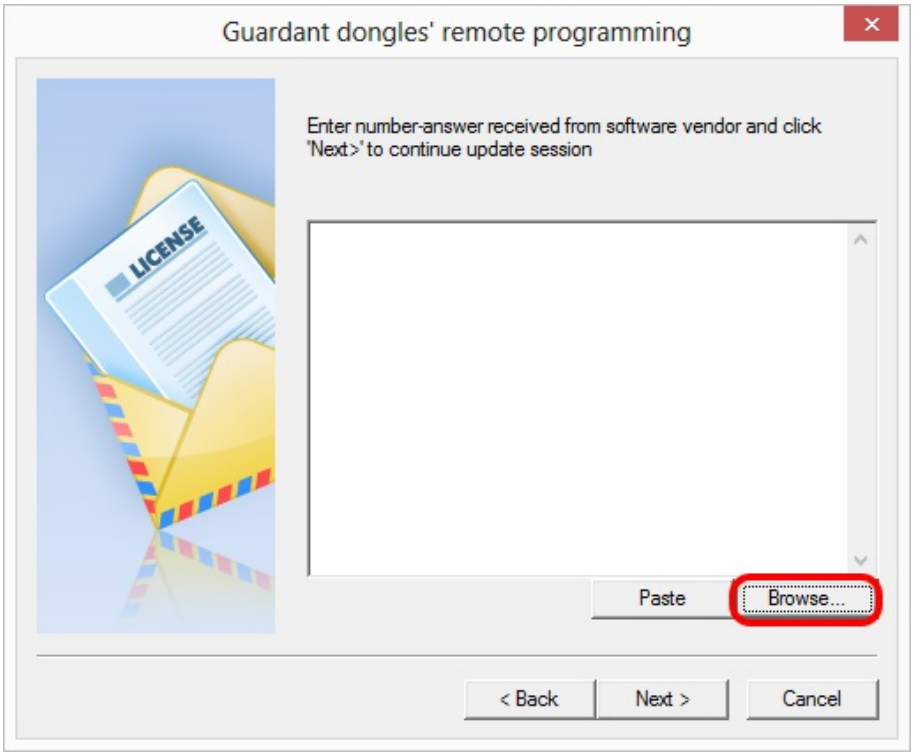


Fig. 193. Browse button

Click the “Browse…” button.

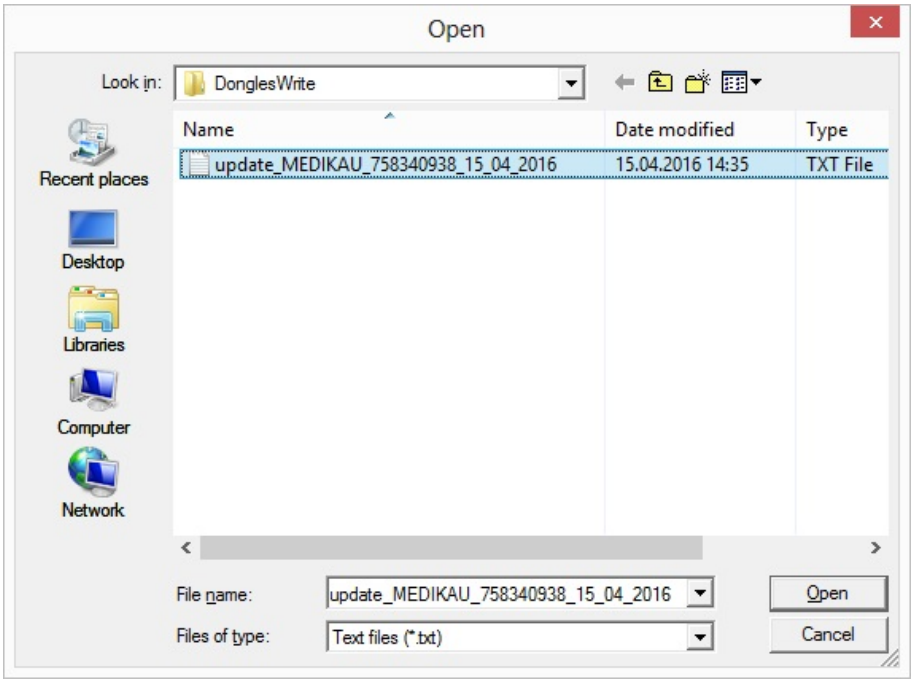


Fig. 194. Received file

Find and open the received file.

Click “Next”.

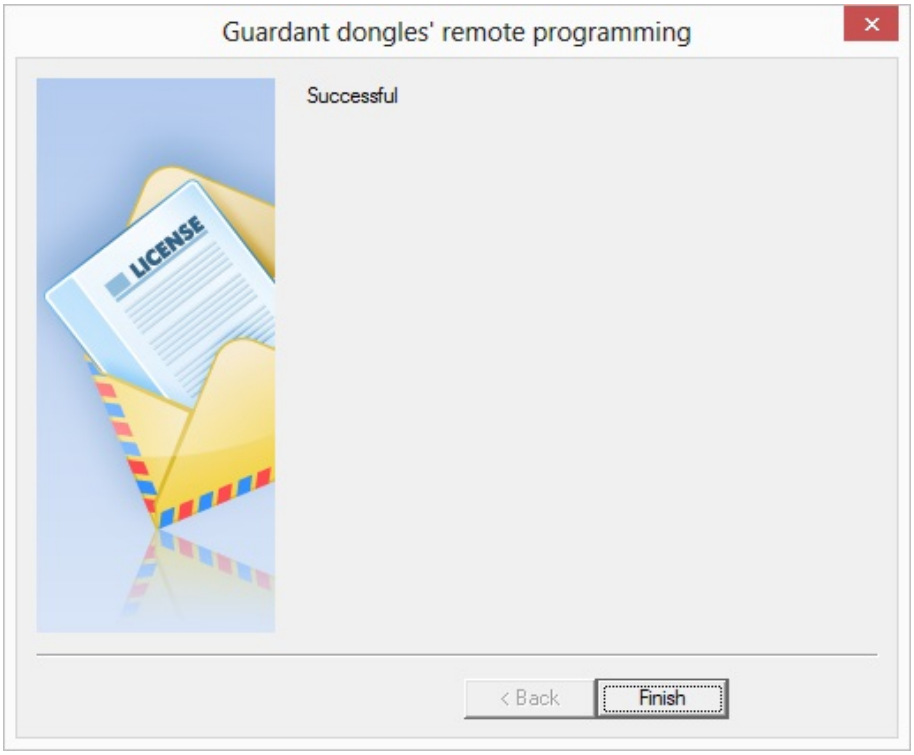


Fig. 195. Dongle is updated

The dongle is now ready to use.

9 Microscope Illumination Adjustment

Before operating a microscope you must set it for Koehler illumination according to the microscope user manual. Koehler illumination ensures the best possible balance of contrast and resolution. In case you do not have a user manual for Koehler illumination, set the illumination the following way.

1. Switch on the microscope illumination and place a slide on the stage. Turn the objective (10x) into the light path and adjust focusing.
2. Move the condenser upwards with the adjusting screw.
3. Make sure the field diaphragm (on the collector) and the aperture diaphragm (in the condenser) are fully opened. Turn the adjustment ring of the field diaphragm until the edge of it is visible only on the external edge of the field of view.
4. Using the adjusting screw, move the condenser up or down to focus the edge of the field diaphragm.
5. If the edge of the field diaphragm is not in the center of your field of view, move the field diaphragm image to the center using centering screws.
6. After you get a sharp image of the field diaphragm in the center of the field of view, open the field diaphragm so that the image of the iris diaphragm edge would be right beyond the field of view.

Field of view before condenser adjustments	Field of view after condenser adjustments	Field diaphragm partially opened	Field diaphragm fully opened

Fig. 196. Aperture diaphragm in different stages of illumination alignment for Koehler

7. Take out one of the eyepieces and look through the tube at a ring of light passing through the back plane of the objective. Close the aperture diaphragm using the ring on the condenser and leaving approximately 2/3 of the light ring. Put the other eyepiece back.
8. Your microscope is aligned for a 10x objective. Every time you change the objective you'll need to align it again.

If you use the 40x Oil Meiji Techno immersion objective, you need to check the position of the objective aperture diaphragm (the diaphragm ring should be turned firmly in the clockwise direction). You also should drop immersion oil under the objective and focus it for sharp image of the slide surface. The image sharpness is adjusted according to the right-hand screw: the joystick rotated counterclockwise lifts the stage, if it is rotated clockwise, the stage is lowered.

Warning!
Working with immersion oil require conformance to the good laboratory practice. Please wear laboratory gloves every time handling immersion oil.

Important!
Using wrong or too viscous immersion oil affects the scanning precision, therefore important cells might not be captured, which affects the diagnosis to the patient.

Important!
Dirty objective with dirty immersion oil could affect the quality of the sample, therefore sample results might become wrong interpreted which could affect the diagnosis to the patient.

10 Maintenance

Attention!
Do not update the OS.

10.1 Daily cleaning

Daily cleaning has to be done by the laboratory personnel following the usual conventional microscope cleaning procedure.

1. Cleaning should be performed on shut down equipment.
2. Clean the objectives and the stage.

Attention!
Use alcohol for cleaning no more than once a week. Use diluted alcohol solution (maximum 70%) for daily cleaning.

Important!
Not cleaning the stage or objective after spillage or dirty oil might cause stage malfunctions and affect the quality of analysis.

3. Do not touch the centering screws of the condenser during cleaning.
4. Check the condenser, the diaphragm setting value should not be higher than 1.
5. Prime the oil dispensing tube by holding the “Prime” button for several seconds. Make sure that the tip is inserted into the bottle[44].

10.2 Service maintenance

An engineer should come at least once a year for service maintenance of the kit: cleaning, mechanical check-up, software and settings checks. No parts should be maintained or replaced by the user.

10.3 Safety of electronical components

A periodical inspection of the safety of electronical components is recommended every 2 years, but not less than every 36 months following the ÖNORM-EN-62353.

[44] Depends on delivery package

10.4 Immersion oil dispenser. Filling the bottle with immersion oil[42]

Fig. 197. Filling the bottle with immersion oil

Fill an empty bottle with immersion oil as shown on the image above.

Warning!

Please wear protective gloves to prevent irritation of skin when working with immersion oil.

11 Manufacturer Contact Information

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